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CONTENTS.

Original Communications.

PAGE

On the Preparation and Use of Ointments in Diseases of the Skin. By L. Duncan Bulkley, A.M., M.D..... 505
The Pathology and Treatment of Pulmonary Phthisis. By Heneage Gibbes, M.D..... 511
The Status of the Hydrochlorate of Cocaine in Minor Surgery, as based upon the Experience of Philadelphia Physicians. By Lewis H. Adler, Jr., M.D. 518
Creolin in Dysentery, Serous Diarrhœa, and Summer Complaint. By Edward W. Watson, M.D..... 533
The Value of Chloralamid as a Calmative in the Final Stages of Heart-Disease. By J. A. Patterson, M.D... 534

Leading Articles.

The Prophylaxis of Diphtheria..... 536
Rhus-Poisoning and its Treatment..... 537
The Radical Cure of Hernia..... 538
Ethylene Bromide—A New Remedy in the Treatment of Epilepsy..... 540

Reports on Therapeutic Progress.

Permanganate of Potassium as a Urinary Test..... 535
The Treatment of Pharyngeal Diphtheria by Submembranous Injections..... 541
The Employment of the Leaves of the Combretum Raimbaultii in the Treatment of Bilious Hæmaturic Fevers.... 542
The Action of the Vapor of Ethereal Oils on Bacteria..... 542
On the Mode of Elimination of Iron Salts..... 543
Resection of the Lung..... 543
The Alkaloid obtained from the Tubercle Bacillus..... 544
The Advantage of combining Iodine with Glucose..... 545
Albuminuria in Persons apparently Healthy, and its Relation to Life Insurance..... 545
Treatment of Diphtheria..... 546
Drainage in Abdominal Surgery..... 546
The Treatment of Osteomalacia by Castration..... 548
The Treatment of Erysipelas..... 549
Asthma in Children..... 549
The Management of Lithæmia..... 551
The Treatment of Acute Articular Rheumatism by Hypodermic Injections of Carbolic Acid..... 553
Corrosive Sublimate as a Disinfectant... 553
Salicylbromanilide..... 554
Antipyrin as a Hæmostatic..... 556
Succinate of Iron..... 556
Absorption of Food-Stuffs after Extirpation of the Pancreas..... 557
Adaptation of Different Organs to the Prolonged Use of Atropine..... 558
The Gallate of Bismuth..... 559
Infantile Pleurisies and their Treatment 559
Celastrine, the Active Principle of Celastrus Edulis..... 560
The Diuretic Properties of Theobromine and Diuretin..... 560
The Action of Nicotine on the Circulation..... 562

Reviews..... 563

Correspondence.

Berlin Letter..... 567

Notes and Queries.

Iodophenacetin—A New Antiseptic..... 570
The Physiological Action of Kola Nut.. 570
Cocaine and Mercury Compounds..... 570
The Danger of Unboiled Milk..... 571
The Effect of Asparagus on the Urine... 571
The Combination of Iodine and Glycerin 572
Medicated Oils for Hypodermic Injection..... 572
Therapeutic Precision..... 572
Typhoid Fever with Arterial Thrombosis and Mania..... 573
The Action of Antiseptics upon the Peritoneum..... 574
A Cheap Disinfectant..... 574
Alkaline Silicates in Therapeutics..... 574
A Case of Poisoning following the External Application of Tobacco..... 575
The Cause of Diphtheria in Rural Districts..... 575
Permanganate of Potassium in Diphtheria..... 576
Local Use of Menthol and Eucalyptol in Affections of the Middle Ear..... 576

Original Communications.

ON THE PREPARATION AND USE OF OINTMENTS IN DISEASES OF THE SKIN.

By L. Duncan Bulkley, A.M., M.D.*

THE application of ointments constitutes such a large element in the treatment of diseases of the skin, by the profession at large, that it has seemed desirable to present from experience a few words of caution and advice concerning their preparation and employment; for no one who has had much to do with dermatological practice can have failed to see harm, or, at least, want of success often resulting from the improper compounding or application of one or another of this class of remedies.

It must first be premised that, when speaking favorably later on of this or that ointment or method of local treatment, it is always to be understood that reference is only made to their value as far as relates to local treatment, the question of the appropriate dietetic, hygienic, and internal medicinal measures being left unconsidered; these latter, however, often, as is well known, are, in many instances, of far greater importance than the local medication employed.

It is also to be understood that in recom-

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mending various ointments this is by no means to the exclusion of other topical measures, which are often of even much greater value than this class of substances in certain diseases of the skin; among these may be mentioned lotions, oily applications, powders, fixed dressings by means of plasters, collodion, gelatin preparations, etc. All of these have their use, and often are, each of them, the only really suitable application in particular diseased conditions.

But, as the subject of the local treatment of diseases of the skin is a very large one, I have limited the present consideration to that of ointments, in order, if possible, to present a clearer idea of their real value and use, and to rectify some of the errors which are occasionally met with in their employment.

Turning to the Pharmacopœia of the United States, we find about one dozen substances or compounds with which to prepare ointments, and under the heading of cerates and ointments almost fifty officinal combinations of these, with various remedies, are presented for our use. We will first comment upon some of the bases commonly employed for ointments, and then consider some of the combinations with remedies which have become officinal; and later will offer some practical applications regarding the employment of this class of applications in diseases of the skin.

First on the list comes *adeps preparatus*, or lard freed of its impurities by boiling with water. This forms a fair basis for ointments, but is not acceptable to many skins; also for many conditions it has not sufficient body to form the protective coating requisite; and, moreover, it is apt to become rancid, and thus even to prove a source of irritation, instead of soothing an already inflamed skin. To obviate this tendency to rancidity, the Pharmacopœia directs that it be benzoinated, by incorporating 2 parts of benzoin to the 100 of lard. This in a measure accomplishes the object desired, but is not always sufficient, as the decomposition will often take place in spite of this precaution. Moreover, the benzoin itself may prove somewhat irritating to delicate skins. It is better, therefore, not to trust to any artificial means for preserving the freshness of ointments, but to secure sweet and good material, and always to reject that which is at all old, or ointments which have been long prepared.

A word may be here added in regard to the very great importance of the matter which has just been mentioned,—namely, the absolute avoidance of the slightest rancidity in ointments, for it not infrequently has happened in my practice that an ointment which had before proved very acceptable was found, after it had been kept some time, to irritate the skin greatly. On examination a rancid odor was plainly detected, and when freshly prepared the same combination was again agreeable to the diseased surface. It may be here remarked that there is often this danger in prescribing many of the officinal ointments,—namely, that having been kept some time in stock, they have become rancid, and have thus become intensely irritating. Undoubtedly some of the failures seen to follow remedies or combinations ordinarily of service are due to rancidity of the excipient with which they are prepared. It is, better, therefore, to order the ointment to be freshly compounded of the strength desired, rather than to take that officinally prepared and kept in stock.

We find two preparations by the name of cerate, which are in some respects more valuable for ointments for most skin-affections than lard. The one, *ceratum simplex*, consisting of white wax 30 parts, and lard 70 parts; the other, *ceratum cetacei*, composed of spermaceti, 10 parts; white wax, 35 parts; and olive oil, 55 parts. To these should be added the *unguentum cetacei*, which is very like the latter, only somewhat softer, being composed of spermaceti, 20; white wax, 8; and olive oil, 64 parts. These all have considerable body, and when spread on the skin form a protective coating, more suitable for many conditions than lard alone; but the first mentioned, or simple cerate, is far too hard for easy application in most diseases of the skin.

We have next two substances known as glycerites,—the one, the *glyceritum amyli*, composed of starch 10 parts and glycerin 90 parts; and the other, *glyceritum vitelli*, with 4 parts of yolk of egg to 5 of glycerin. The glycerite of starch forms a good basis for ointments, when fatty substances are not well borne, or when it is desirable to remove the application frequently with water. Combined with oil of cade 25 parts, sapo viridis 15 parts, and glycerite of starch 60 parts, it makes a most valuable application in psoriasis, which can be well rubbed in at night and washed off completely in the morning. The glyceritum vitelli is little, if at all, used in dermatology, but should form a good application to the skin, possibly with the addition of spermaceti or wax to stiffen it.

The *oleum theobromæ* is the next basis men-

tioned in the Pharmacopœia. This is but little used ordinarily in compounding ointments, but is an ingredient of many of the advertised nostrums, and should not be neglected. It is particularly useful when added, in about a quarter part, to ointments for use on the hairy scalp, to give them a low melting-point, and to aid in forming a protective coating over the skin; when employed in too large a proportion, it will prove irritating to many skins.

Under the head of "Ointments" we find but two preparations in the Pharmacopœia,—the *unguentum simplex*, composed of lard 80 parts and yellow wax 20 parts; and the *unguentum aquæ rosæ*, of expressed almond oil 50 parts, spermaceti 10, white wax 10, and rose-water 30 parts. The unguentum simplex is a good combination, much better for general use than simple lard; but, on the other hand, it is often found to be too hard, and ointments made with it will often be difficult of application, and when made up some time, with other ingredients, will become too stiff for ready use; as ordinarily kept in the drug-stores, I have not infrequently found it to be quite rancid.

The best ointment of all, when fresh and properly made, is, in my judgment, the *unguentum aquæ rosæ*,—the cold cream of the Pharmacopœia,—and this is the one which I use, almost to the exclusion of all others, in my practice. But some judgment and skill is necessary in its preparation, for, unless very perfectly compounded, with prolonged rubbing together of the ingredients, the ointment will not be perfection; in summer also it will require rather a larger proportion of the spermaceti and white wax, in order to have the proper consistency for a perfect application. Very frequently, when the skin tends to be too dry, a portion of the water may be replaced by glycerin. Occasionally the odor of the rose-water is not agreeable to the patient, and simple distilled water may be used in its place. The water held in this ointment is undoubtedly an important element in its remarkable effects on the skin, for the *ceratum cetacei* and *unguentum cetacei* have quite a similar composition, but are by no means as agreeable to most skins.

When the various products of petroleum, known in the Pharmacopœia by the general name of *petrolatum*, were introduced, it was thought that they would furnish the best possible bases for ointments, and that they would rapidly supersede all other excipients; they were soft, cleanly, uniform in composition, and not liable to become rancid, and seemed to fulfil all possible indications for this branch of therapeusis. But if the experience of others is similar to mine, these preparations will never supplant those already mentioned and others of recognized value. While the petroleum preparations have their value in certain conditions, they have, in my hands, failed to give the satisfaction hoped for. They are by no means always agreeable and non-irritating to the skin; indeed, many individuals are found who cannot bear them on the skin at all. Most of them, vaseline particularly, have not body enough to form good ointments, although for simple inunction, as a lubricant, or for the application of carbolic acid to the skin as an antipruritic, vaseline serves the purpose very well. But practically I order very little of this class of preparations, either in private practice or in my public clinics.

Recently, when *lanolin*, and subsequently *agnine*, were presented to the profession, it was expected that this substance would replace other ingredients as an excipient for ointments. But, again, we have been disappointed, and lanolin forms but a very small portion of the base of ointments, with those especially occupied with diseases of the skin. It is too sticky, and not easy of application, and, moreover, it will often prove irritating to a delicate skin. While it was thought to afford a means for the more ready absorption of medicaments, more experience has shown it to be questionable if this is the case. Indeed, in some recent experiments by Brooke, it was shown that the substances incorporated with lanolin were the slowest in entering the system. Moreover, in a large proportion of instances, it is not desired to secure this effect from remedies used in ointments, they being employed more for protective purposes than to secure the penetration of the substance into the economy. Lanolin, however, is useful as an addition to certain ointments, in the proportion of about twenty per cent., to give an adhesive quality to them, thus securing a firmer and more adherent coating for affected parts.

We come now to speak of some of the officinal ointments of the Pharmacopœia, representing combinations of various substances in proportions supposed to be serviceable for various purposes. As the number of these is large,—nearly fifty,—it will not be possible in our present limits to comment on all, or even a large proportion of them; but the thought arises as to how or why some of them became officinal, for certainly very many of them are

wholly unsuitable in the strength given for the conditions for which they are recommended.

Three groups of these combinations are formed,—cerates, ointments, and oleates.

There are six of the officinal cerates, none of which are of practical application in diseases of the skin. Two of them are of cantharides, with also an ointment of cantharides, all of which would only be of use when much diluted as a stimulant application for the hair. The most commonly used cerate is probably the *ceratum resinæ*, or basilicon ointment, a very stimulating application, which I have frequently seen do much harm when ordered for a delicate or inflamed skin. There are also a cerate and an ointment of the subacetate of lead, the former of which is too strong for common use, and the latter perhaps too weak.

There are some forty officinal ointments, very few of which can be prescribed, as they are with advantage in diseases of the skin. Thus, the carbolic acid ointment is made of a strength of ten per cent., which is far too strong for most skins; whereas, the tannin ointment, of the same strength, is too weak to be of real service. The belladonna ointment is also of the same strength, and is capable, if used at all freely, of producing serious constitutional effects. I have seen severe symptoms follow its use, three or four times diluted, when applied about the vulva to remove itching. Also the officinal ointment of chrysarobin is of the same strength, equal to forty-eight grains to the ounce, a far too great strength to be borne by most skins without excessive inflammatory effects.

Eight ointments are found containing preparations of mercury. Of these, the blue ointment, containing fifty per cent. of metallic mercury, is well known, and of great value; but for inunction on most skins it requires dilution by one-half, in order not to excite too much local irritation. The next mercurial ointment is that of the white precipitate, which is ten per cent., or forty-eight grains to the ounce. This is most commonly required to be two or three times diluted, even in psoriasis and seborrhœic eczema. The red iodide ointment, sixteen grains to the ounce, is of fair strength, but to be effective in lupus, or where its corrosive power is required, it should be employed much stronger.

Citrine ointment, one of the best known of the mercurial applications, is far too strong to be freely used, and I have repeatedly seen much harm follow when it was thus ordered in full strength. When diluted two to four times it often serves a good purpose in reducing infiltrations of the skin.

The ointments of the yellow and red oxide of mercury, each ten per cent., or forty-eight grains to the ounce, require to be very greatly diluted for use about the eyes, where they are commonly employed. The unguent hydrargyri subchloridi, of a strength of eighty grains of calomel to the ounce, is also much stronger than commonly employed. I rarely have occasion to prescribe over thirty grains in the ounce.

The single ointment of iodine is a good preparation, containing a trifle of iodide of potassium. A frequent prescription of mine, which is of great service in reducing glandular enlargements in syphilis, is a mixture of this ointment with the ordinary mercurial ointments, in equal parts. When well rubbed together, an ointment of the green iodide of mercury is made, which acts much more quickly than either of the ointments alone. For delicate skins this may require some dilution, but generally it is well borne, and at the Skin and Cancer Hospital it is kept in stock, and known and prescribed as the "double ointment," and is daily used as a parasiticide in ring-worm and favus of the scalp.

The unguentum picis liquidæ is an excellent remedy, composed of equal parts of tar and suet; but is far too strong for general use undiluted. When combined with oxide of zinc and rose ointment (℞ Ung. picis, ʒii; zinci oxidi, ʒss; ung. aquæ rosæ, ʒvi), it forms one of the most perfect applications known for a large share of cases of subacute eczema, both in children and adults. It is almost impossible for a part to itch when thickly covered with a layer of this spread on lint, and bound firmly on a part. It is the standard treatment for a large share of cases in my clinics at the Skin and Cancer Hospital and at the New York Hospital, and is prescribed daily in my private practice.

The ointments of the carbonate of lead and iodide of lead, each ten per cent., are also good combinations. The latter is certainly an excellent means for causing absorption of enlarged strumous glands. The stramonium ointment, containing ten per cent. of the extract of stramonium, is likewise a good application, and forms a most valuable base for combination with acetate of lead and opium in the treatment of external hemorrhoids.

There are four ointments containing sulphur, only one of which, the unguentum

sulphuris, with thirty per cent. of sublimed sulphur, is well known or much used. This is also too strong for direct application to most skins, as probably all have seen artificial dermatitis excited after its use for scabies. Diluted two or three times, with a little storax, and perhaps a little tar ointment, it forms an excellent treatment for scabies, although the more agreeable applications of naphthol and resorcin have largely taken its place in dermatological practice. The sulphuret of potassium ointment, and that of iodide of sulphur, each thirty grains to the ounce, seem superfluous, as I am not aware of their ever being used. The turpentine ointment, with equal parts of turpentine and an excipient, with some rosin, is a highly stimulating application, whose real utility seems very questionable.

The oxide of zinc ointment of our Pharmacopœia is a fairly good preparation, with a strength of twenty per cent. of zinc, or ninety-six grains to the ounce. This is stronger than I commonly employ it, and is made with benzoinated lard, which is not always agreeable to all skins. Moreover, as found in stock in the shops it is occasionally rancid, and I have frequently found it irritating, when a properly prescribed zinc ointment, in cold cream, freshly prepared, proved most grateful and healing.

The *unguentum diachyli* has been reserved to the last for comment, because of the very great importance of the subject, and because of its relation to the next group of substances, —the oleates. When properly made and fresh, diachylon ointment is one of the most valuable means of local therapy known for many diseases of the skin; but, as it is commonly furnished by the druggist, when no special effort has been made to have it correct, it is not only useless, but very commonly will be found to be decidedly harmful.

The Pharmacopœia directs that it shall be made by melting 60 parts of lead plaster with 39 of olive oil and 1 of the oil of lavender. The samples of the ointment ordinarily made in this way, which I have seen, have been tough, hard, and altogether inapplicable for spreading on lint or laying on a diseased surface; whereas, when made according to the original formula of Hebra, found in many books on diseases of the skin, and also given in the German Pharmacopœia, it is a soft, buttery ointment, easily spread, and of a delightfully soothing character to most skins.

The principles involved in the two preparations are quite different. In our officinal directions the hard, lead plaster is melted with forty per cent. of raw oil, which is not decomposed, but simply intermingles with the plaster, making it of a softer consistency. In the formula of Hebra the entire quantity of oil requisite to form a soft ointment is boiled with water, and as the litharge is sifted in, all of it decomposes, forming really an oleate of lead; and any one who will carefully compound the two preparations, each made according to the directions given, will see at once the greatly different result of the operations. It has also been proposed to make a diachylon ointment by melting the lead plaster with vaseline and cosmoline. The results from this are, however, also far from satisfactory, and much experience with trials of the diachylon ointment of the shops and that prepared correctly, as advised by Hebra, its main introducer, forces me to most earnestly urge that attention be given to this matter, both by those directly interested in the treatment of diseases of the skin, and also by those who shall have authority in revising our Pharmacopœia.

For many years certain combinations with oleic acid have been advised, under the name of oleates, and a number of remedies have been presented to us in this combination; but aside from the diachylon ointment, or oleate of lead, just referred to, but two have found place in our Pharmacopœia; these are the oleate of mercury and the oleate of veratrine. The former, which is officially ordered to be of the strength of ten per cent., is very useful, but occasionally requires dilution one-half for delicate skins, and a strength of twenty per cent. may often be required. The oleate of veratrine, of a two per cent. strength, may be of use, but I have never had occasion to employ it. Other oleates, recommended by Dr. Shoemaker and others, are those of aluminium, arsenic, bismuth, cadmium, copper, iron, manganese, nickel, silver, tin, and zinc, also those of quinine, strychnine, aconitine, atropine, and cocaine. I have had very little experience in the use of these, but have not been favorably impressed with the effect of those I have tried. The oleate of copper I have made use of on repeated occasions on parasitic scalp cases, but unfortunately with very indifferent results.

From this hasty review of some of the principal applications in the form of ointments furnished by the Pharmacopœia, it will be seen that in the line of dermatology there is room for improvement, and the Dispensatory

which describes these and their uses would hardly be a safe guide in the treatment of diseases of the skin. It is hoped that future compilers of this widely-used work will in future have more regard for this branch of medical practice.

A few words may now be added in regard to the actual preparation or compounding of ointments, a feature which continually requires the attention of the physician, if he would have success in the treatment of skin-diseases. While it is a great deal to have the right remedies prescribed, in their right proportions, it is almost equally important to see that the patient receives exactly that which was intended, and that it is prepared in the best manner possible. Attention has already been abundantly directed to the danger of having the least rancidity in the ointments applied to the skin. For this and other reasons to be mentioned, it is desirable for the physician to frequently inspect the ointments, or other preparations which are being employed, and to test them by smelling, feeling, rubbing on the skin, etc. A striking illustration of the need of this is found in connection with diachylon ointment, as already mentioned.

A great deal of harm is done sometimes by not having the ingredients of ointments finely enough pulverized and sufficiently well mixed with the excipient. I well remember once prescribing half a drachm of the ointment of the red oxide of mercury, which should contain three grains of the salt, to be rubbed with three drachms and a half of rose ointment, for an application to the eyelids. What was my astonishment the next day to find the patient with highly-inflamed eyes, and complaining bitterly of the severity of the treatment. Examining the ointment, I found it a brilliant red, and full of sandy red particles. On questioning the druggist, I found that he had taken half a drachm of the coarse mercurial salt (instead of the ointment), and simply mixed it with the amount of simple ointment ordered, thus making it ten times the desired strength. Moreover, there were large grains of the oxide of mercury, which stood out plainly in the ointment, and were gritty when rubbed between the fingers.

The metallic or other ingredients of an ointment should always be triturated most carefully in a mortar till an impalpable powder is formed. It is well then to add a few drops of sweet almond oil, making it a paste, which is then slowly incorporated with the greasy or other preparation ordered. I cannot leave this portion of the subject without again urgently advising that those who wish to attain the highest measure of success in treating diseases of the skin pay special and particular attention to the preparation of the ointments prescribed. Time spent by a physician in active work or observation, or study behind a prescribing-counter, is never wasted, and will often yield the highest reward.

There are many matters which could still be considered in connection with our subject, but this paper has already exceeded the limits desired, and a few words only will be added in regard to the employment and actual application of ointments.

In the first place, my observation leads me to remark that more harm is commonly done by too strong ointments than is usually supposed. The skin is a sensitive and irritable organ, and more often wants to be treated considerately and soothed into good action, than it does to be stimulated and irritated. It is well to begin with a mild preparation, increasing the strength as circumstances seem to demand; or, if a strong application is first given, let the patient understand what is expected or what may happen, and give directions for its dilution with cold cream or otherwise, if necessary.

It is also well to remember that the average patient, who has not heretofore been instructed, or who has not had special experience, knows nothing in regard to the best mode of application of an ointment, and if the highest degree of success is to attend the use of any particular remedy, it must be only by its proper employment. Careful directions should, therefore, always be given to patients exactly how to apply ointments, how frequently to make the application, when to change the dressings, and what to do with the part before and after applying the ointment; for my experience has shown me that, if it is possible to use it in a wrong way, the average patient will generally strike just that wrong way. As a corollary to this, it may be remarked that it is also well to question the patient later, and perhaps several times, to ascertain if the remedy has been used in exactly the right manner; for, as remarked before, a large share of the apparent want of success in this line of practice, by those who are not specially occupied in it, comes from a failure to have all the details of treatment rightly and carefully carried out.

The demand in dermatology is not so much for new drugs, applications, or methods of treatment, as it is for the diffused knowledge of what is already known to be of service, and the faithful carrying out of methods which experience and observation have proved to be useful.

The majority of patients will be inclined to apply ointments at night, and then to wash them well off in the morning. Now, in very many conditions, this procedure is absolutely fatal to any successful treatment, and it is readily seen that the application of a remedy for only one-third of the twenty-four hours can have very little effect, while the act of washing will sometimes more than counteract the benefit derived from the ointment. Therefore, whatever plan of treatment is desired must be explicitly and forcibly laid down and followed, and the matter not be left to the judgment or inclination of the patient.

Again, most patients will, on covered portions of the body, smear an ointment over the affected surface, and then wrap some linen or muslin loosely about the part. When examined shortly after, the wrap will be found to have absorbed the greasy base of the application, and the skin will be dry or covered with a thin layer of the mineral or other solid constituent of the ointment. Now, where it is desired to keep a part continually under the effect of an ointment, it should be soaked in it, if it were possible, as completely as though the part were immersed in a very large mass of the same; but, as this is not possible, we have recourse to lint, and the ointment, which should always have considerable body, is spread to a very thick layer on the woolly side of the lint, and then firmly bound on the part.

An excellent illustration of the necessity for minute directions in regard to all these data is found in connection with eczema of the scrotum. When treated carelessly, or when the patient merely smears on an ointment, the disease will prove most distressing and rebellious; but when, on the other hand, very minute directions are given, in regard to the sudden and brief application of hot water, once daily, at bedtime, and when then the part is quickly dried and enclosed in a piece of lint spread with the tar and zinc ointment, previously alluded to, covered by a suspensory bandage, the patient has complete relief, and with proper other treatment can surely be cured, and that with reasonable speed.

Time and space forbid my pursuing further this interesting subject of ointments and their application; but I trust that enough has been said to direct some attention to the subject, and that thereby some of us may get better results in our practice and some patients more relief from their sufferings.

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*THE PATHOLOGY AND TREATMENT OF PULMONARY PHTHISIS.**

By Heneage Gibbes, M.D.†

PULMONARY consumption has existed among men as far back as we have any historical record of disease. It is credited by Hirsch with about two-sevenths of all deaths, and lately has excited so much interest in the profession that I need offer no apology for making it the subject of my address.

I use the term pulmonary consumption to include those cases where progressive wasting of the body is associated with consolidation and the formation of cavities in the lungs.

In the earliest account of this disease we find it described as a suppuration of the lungs. Later on we find an account of large and small tubercles associated with suppuration and ulceration.

The word tubercle was first used to denote any small swelling or node, and as far back as 1700 we find Mangetus comparing the tubercles found in the lungs, liver, and spleen with millet-seeds.

We find various descriptions of this disease after this, and controversies arising as to whether all consolidations in the lungs were formed of tubercles. Two forms of tubercle were spoken of,—the miliary and tuberculous infiltration; and we come to the time of Niemeyer, who considered that a large majority of cases of phthisis were inflammatory. This view was widely held until a comparatively recent period, and is still supported by high authorities.

At the beginning of the year 1882 the majority of clinicians of any standing firmly believed in the duality of phthisis.

In April of that year came the announcement that Dr. Robert Koch had discovered the bacillus of tuberculosis, and that inoculation with this organism invariably reproduced the disease in susceptible animals. Every one at once set to work examining sputum

* Address on "Practice of Medicine," at the annual meeting of the State Medical Association, Saginaw, June 11, 1891.

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and recording the results of their observations. Watson Cheyne was sent by the Association for the Advancement of Scientific Research to Berlin to examine Koch's work, and, if possible, corroborate it. This he did, by going to Koch's laboratory, obtaining material from him and working by his methods, and getting results, which he published in the *Practitioner* for April, 1883, and his work is held in the latest editions of the English textbooks on pathology to be the corroboration of Dr. Koch's results.

The accepted position at the present time with a large majority of practitioners in this country is that wherever the bacillus tuberculosis is found there is tuberculosis, and it is this position which I propose to discuss in this address.

We are told that the tubercle bacillus is the virus of tuberculosis, and we therefore ought to be fully aware of the conditions under which it exists in disease, so that we may have some rational idea as to the treatment we should adopt in these cases.

Now comes the question, If we are going to investigate this disease, what morbid conditions shall we take as the basis on which to commence? Naturally, we should say, those in which cavities exist in the lungs; but we find that tubercle bacilli are found in cases where there are no cavities. We must, therefore, extend our base, and take in consolidations. Now, we find these existing, in a number of different conditions, in the old-fashioned pulmonary phthisis, in chronic tuberculosis, in acute miliary tuberculosis, in acute pneumonia, in the lesions of syphilis, and in hydatid disease, also in cancer and sarcoma. All these cause consolidation; but, to simplify matters, we will leave out all but pulmonary phthisis, chronic tuberculosis, and acute miliary tuberculosis. These three diseases are characterized by the formation of consolidations in the lungs, and in all of them tubercle bacilli are found. Therefore, with the prevailing view, these are all tuberculosis, and are all caused by the action of the tubercle bacillus of Koch.

To commence with pulmonary phthisis, as I understand it. This is a common result in a case of catarrhal or broncho-pneumonia, either in a weakly patient or where the disease is of unusual severity, and the consolidation is brought about most commonly in one of two ways. We will take for an example a delicate girl getting her feet wet and catching a cold. This passes into bronchitis, and the inflammatory process extending involves the small bronchioles. The case then becomes one of capillary bronchitis. When this stage is arrived at, two courses may be taken by the disease,—the inflammation may pass on from the bronchioles into the lung-substance, and develop into a case of catarrhal or broncho-pneumonia, or the products of inflammation may block up one or more of the small bronchioles by forming a plug in them, which is drawn farther in and more firmly fixed at each inspiratory effort, the result being that no more air can enter those lobules of the lung supplied by the plugged bronchioles. When this has taken place, the air imprisoned in these lobules soon becomes absorbed, and they pass into a state of collapse. Now, in any form of collapse of the lung, the greatest danger arises from the almost inevitable inflammatory action, which is at once set up in the air-vesicles in this collapsed condition.

We have, then, in these cases a portion of the lung consolidated either by direct extension of the inflammatory action, from the bronchioles or by the inflammatory action, set up by the collapsed condition, which is chiefly brought about by the inflammation in the bronchioles. Now, supposing that this delicate girl has not sufficient vitality to throw off this inflammatory process in her lungs, but that it is allowed to go on until the acuteness of the inflammation has destroyed the affected part and it has become devitalized.

We have, then, one or more portions of the lung in a necrosed condition. This dead tissue undergoes a further disintegration, and becomes softened and caseated, and this softened mass is expectorated through the bronchiole connected with it, leaving behind a cavity. This is an inflammatory process from the beginning to the end, and we are all aware how often the whole of this process takes place with great rapidity, and the wet feet result in the death of the patient. I do not think there is anything strained in this example, but that something of the kind must be familiar to you all. We will now inquire into the part played by the tubercle bacillus in this case, for it is in these cases that we find them in enormous numbers, large, long, and full of the so-called spores. We find the sputum loaded with them as soon as the consolidation begins to break down, and we find them in large numbers after death in those consolidations in the lungs which have not broken down, but only in that part of the consolidation which has undergone caseation. We do not find them in the bronchioles of cases of capillary bronchitis dying in that

condition. Now, where do they come in, in these cases, as the virus or causation of the disease?

We will now take chronic pulmonary tuberculosis. This is a condition with a totally different history. We have here a disease of insidious origin, with gradually-increasing weakness, anæmia, nocturnal cough, and irregular fever, and physical signs, at first very obscure at one apex, gradually increasing until marked consolidation is found, which then breaks down, and ends in the formation of a cavity. In the mean time the disease is steadily progressing in this lung, and a similar change is set up in the apex of the other organ. In the early stage, before there is any destruction of lung-tissue, we do not get tubercle bacilli in the sputum, but when the formation of a cavity begins we then find them. Their number varies, however, enormously, and in some few cases they are never found in the sputum during life or in the lungs after death, although these are full of cavities. Taking these widely-different conditions, and wishing to gain some idea of their character, we naturally make a microscopical examination of the two forms, and the microscope shows us that the morbid process is entirely different in the two cases. In the first we find a mass of inflammatory consolidation without a particle of structure. There has been no formation of new tissue, but the inflammatory action has been so intense that portions of the lungs have been destroyed and have undergone a process of disintegration.

In the second form, or chronic pulmonary tuberculosis, we find that the consolidation consists of new growth of a peculiar character, a fibroid tissue has formed from the connective tissue of the lungs, and among the fibres are a number of large multinucleated cells,—the giant cells. These are the tubercles. As they increase in size the centre of each gets its nutrition cut off, and becomes necrosed. Each consolidated mass, however, does not consist of one tubercle, but an aggregation of many in different stages of growth. In the periphery of a large tubercle a number of small ones will be found in the course of formation. Examining these tubercles for the bacillus, we do not find it in the necrosed centre, but isolated among the fibroid tissue, unless caseation or breaking down has taken place, when it generally is found in large numbers, but in some cases is absent altogether.

Passing on to acute miliary tuberculosis, we have another disease characterized by a rapid course, death often taking place, in children, within a fortnight of their being brought to the hospital, and which in some cases presents features which render its diagnosis from enteric fever extremely difficult. If we take a number of these cases and carefully compare them, we shall find a striking similarity in their duration, progress, and the appearances presented by the lungs after death, and tubercle bacilli are never found in the sputum.

When we make a microscopical examination of lungs studded throughout with miliary tubercles, we are surprised to find that they separate themselves into two different classes by the morbid changes existing in them. First, we find a certain number in which the so-called tubercles are merely small foci of inflammatory change, without any formation of new tissue, and all the nodules in these cases are of the same character; secondly, we find another lot of cases, in which the nodules are formed of reticular fibroid tissue with giant cells, and the larger ones have a necrosed centre; and we never find these two forms existing in the same lung. We next examine them for the tubercle bacillus, and we find that the first, or inflammatory form, invariably contain in the centre of each nodule a mass of tubercle bacilli, while the second form may contain none at all after extended search, or, if present, they are found simply among the reticular tissue and not in the necrosed centre.

Now, in pulmonary phthisis, I showed that the disease process was an acute one from the beginning, and the first, or inflammatory, form of acute miliary tuberculosis, or, as Hamilton calls it, disseminated catarrhal pneumonia, seems to me to be easily demonstrated as an inflammatory process also. We know that children expectorate but little. Therefore inflammatory products, in such a disease as capillary bronchitis, would accumulate in their bronchioles. A sudden fit of coughing would be sufficient to draw these inflammatory products into the lungs and distribute them throughout the air-vesicles; the presence of this inflammatory material would be sufficient to set up inflammation in those air-vesicles where it was deposited, without it having any inherent specific action. This process would go on from time to time, and we should find some inflammatory areas of large size, others only commencing, and this is just what we do find on examining the lungs from these cases with the microscope.

We have, therefore, two forms of consolidation in the lungs,—the one brought about by inflammatory action from first to last, the other by a new growth; and the tubercle bacilli are always found in the first when caseation has taken place, but are absent altogether in a few cases of the second form. In the face of these facts, which can all be verified at any time, where is the unity of phthisis, and how is it proved that the tubercle bacillus of Koch is the virus of either of these forms? According to him, in those processes where you find tubercle bacilli, there is true tuberculosis, no matter what the macroscopical or microscopical pathological picture is, or what the clinical evidence may show. This statement has always seemed to me to be too sweeping, and, in view of the different conditions and characters of the diseases in which it is found, I have not been able to accept this statement as true. There is another point, however, which must be considered in regard to the bacillus and its relation to tuberculosis,—namely, the effect produced by the inoculation of tubercular material, or pure cultures of tubercle bacilli into susceptible animals, we were told by Koch that the resulting lesion produced was histologically identical with tubercle as found in the human lung,—that is, reticular fibroid tubercle with giant cells.

This is incorrect, as the lesion produced is not at all similar to that found in the human lung, and also differs considerably, when the material used is taken from a case of pulmonary phthisis, from that produced by material from a case of chronic pulmonary tuberculosis.

There is another point yet to be considered, and one that seems to me to be a most important one, and that is the tuberculosis that we find occurring in cattle. There is a marked difference in the anatomical conditions in the lungs of a cow affected with this disease from anything we can find in the human being. And there is also a marked difference in the bacillus we find associated with it, and also in the conditions produced by the inoculations of susceptible animals. If we examine the lungs of a cow with tuberculosis, we always find large masses of calcification, so much so that it is often impossible to cut sections with the microtome without first decalcifying the organ. Now, this is a rare condition in the human lung. Next we find that the bacillus, although having the same color reaction as that found in the human lung, is much smaller,—at least one-third,—and on cultivation it presents some markedly different features.

The distribution of the bacilli is very different in the cow's lung to what it is in the human. In the cow's lung all the giant-cells contain a large number of bacilli, and the large epithelioid cells, which are very numerous, also contain them. In the human lung I have never been able to find a single bacillus in a giant-cell, and this has been the experience of many other observers. In Koch's original paper we were told that the giant-cells were the habitat of the bacilli, and this statement was repeated in the text-books, and in the last edition of Fraenkel's text-book of bacteriology I find the same statement made. This has a grave significance. It shows that the descriptions have been taken from bovine tuberculosis and not from human. Of course, with the view held by Koch, this was immaterial, and wherever the tubercle bacilli existed there was tuberculosis, but I have found such marked differences between the two forms that I am inclined to think them very widely separated, if not distinct diseases.

From what I have said, if the tubercle bacillus, as Koch affirms, is the virus of the disease, and tuberculosis is wherever this organism is found, it is, to say the least, a most remarkable thing that it should be capable of producing so many varied conditions,—in the one case supplementing the cold produced by wet feet, and causing a process of pure inflammation to result in destruction of the lung-tissue; in the other producing a chronic new growth from pre-existing tissue, which new growth is prone to break down, but which is, however, as distinct a neoplasm as any cancer.

The view that the bacillus is the virus of the disease has caused tuberculosis to be considered an infectious disease, and measures are taken to destroy sputum and isolate tubercular patients. If the bacillus is the virus of the disease, it is difficult to understand how any can escape infection, and the doctrine of immunity is called in to explain it; that is, a susceptible condition is required, without which no infection can take place. What this condition is no one knows, and it seems curious that inoculation with tuberculous material containing tubercle bacilli will invariably produce the so-called tuberculosis in guinea-pigs or monkeys, but will not produce it in human beings, as I have proved by inoculating myself with pus containing numerous tubercle bacilli, and also by the numerous inoculations that take place

from cuts in making post-mortem examinations.

Guinea-pigs are considered to be peculiarly susceptible to tuberculosis, but I have proved beyond a doubt that you cannot induce the disease in them in any other way than by actual introduction into their systems. I have kept healthy animals in cages with inoculated ones for months, over and over again, without their taking the disease.

We will now consider the case as it stands at the present time. Consolidations are found in the lungs which break down and form cavities. These consolidations were considered by such authorities as Niemeyer and others to be formed in different ways and to differ in their structure, and that this difference exists I am at any time prepared to demonstrate. The discovery of the tubercle bacilli, however, at once upset this, and the unity of phthisis was taken as an accepted fact, and everything called tuberculosis where the tubercle bacillus can be found. We have now, therefore, to accept this condition, that this bacillus can produce the bronchitis, catarrhal pneumonia, and pulmonary phthisis which destroy a delicate girl, who initiated the process by getting her feet wet, or in some other manner catching a cold ; or the chronic pulmonary tuberculosis coming on in an insidious manner with well-marked symptoms, and which lasts for years in some cases before it destroys the patient,—the one being an inflammatory process throughout, and in which the clinical signs of inflammation are well marked, the other being a growth of new tissue in the lungs, without inflammation from the beginning. This is shown by the earliest stages in the formation of tubercles in the lungs in acute miliary tuberculosis, which grow in those organs without producing the slightest sign of inflammatory action in the healthy tissue surrounding them. If the tubercle bacillus had not been found in both forms, there would be absolutely nothing to connect them in the present advanced condition of our knowledge of morbid histology. The bacillus being the accepted virus of the disease, it followed, as a matter of course, that the destruction of the virus must be the course to follow if we wished to cure the disease, and innumerable remedies were propounded for this purpose. Among these the hot-air treatment of Weigert. This was tried by a number of men, but proved a complete failure, and showed that its author was entirely ignorant of normal physiological conditions. The aim, however, was manifest,—it was to destroy the bacillus, the virus of the disease.

We now come to the publication of Koch's remedy for this disease, which he gave to the world last year. He stated in his description of his remedy, while keeping the composition of it a secret, that it did not destroy the tubercle bacilli, but the tuberculous tissue, and that this must be living, as it had no effect on dead tissue, such as necrotic cheesy masses. In the first instance, the living tuberculous tissue must be caused to undergo necrosis, and then everything must be done to remove the dead tissue as soon as possible, as, for instance, by surgical interference. This is Koch's statement, and hardly any one seemed to find anything at all outrageous in it. I think, however, there are several points of grave significance to be discerned. It must be remembered that it was the discovery of the tubercle bacillus by Koch, and the proof he gave that its inoculation into susceptible animals would reproduce the disease, that established its position as the virus of the disease, the action of a single bacillus being described resulting in the production of tuberculosis, and on this the unity of phthisis was also established and the views of Niemeyer discarded, except by those whose clinical experience was too great to allow them to do this.

Now, when the author of this great discovery, after an investigation extending over eight years, found a remedy for the disease, we naturally expected that its first and most vigorous action would be on the bacillus, which he himself had shown was the causation of that disease ; but no, we are calmly informed that it had no action whatever on the bacillus, but only on tuberculous tissue, and none whatever on necrotic cheesy masses, and this tuberculous tissue was to be first destroyed by the remedy and then got rid of by surgical interference.

Let us see what Koch's own description excludes from the action of his remedy. First of all, every case of inflammatory consolidation of the lungs, where there is no growth of tuberculous living tissue, but necrotic cheesy masses in which the presence of numerous tubercle bacilli, according to him, prove it to be tuberculosis.

Next all those cases of tuberculous growth in the substance of the lungs, which growth the remedy was to destroy but could not remove, as I do not think that, even with the advances made in scientific surgery, the surgeon is prepared to open the thoracic cavity of a patient and slice up the lungs to hunt

for tuberculous tissue hidden in their substance. This leaves lupus and tuberculous joints. On what evidence are these to be considered tuberculosis at all? because in a very few cases some tubercle bacilli have been detected. It is notorious that in numbers of so-called tuberculous joints no tubercle bacilli can be found, and in a paper on this subject lately published an attempt is made to show that these bacilli at certain stages of their growth will not take the special stain. This is a pure assumption, but on a par with the special pleading adopted by the same writer to bolster up Koch when his comma bacilli of cholera was shown to be merely a concomitant of the disease. This remedy of Koch has turned out a disastrous failure, and Dr. Cornet, who, a short time ago was charging twenty-five dollars for each inoculation, and seeing two hundred patients a day, and who built a large hospital at Charlottenburg for this treatment, has been obliged to close his hospital for want of patients. With regard to the composition of Koch's lymph, when he at last made a statement as to what it was, we were informed that it was a glycerin extract of pure cultures of tubercle bacilli, I imagine nearly every one was under the impression that these were bacilli derived in the first instance from the human lung. I do not think, however, that any one who has done much work in cultivating these bacilli could believe that the immense amount of lymph sent out from Koch's laboratory could have been derived from this source. These bacilli grow very slowly, and it is not an easy matter to get them to grow luxuriantly. With the bacilli from cows' lungs, however, it is different, as they grow readily, and in about five weeks the growth will cover an ordinary tube. Should it eventually be proved that bovine and human tuberculosis have important points of difference, it ought to be definitely stated whether the lymph sent out was all derived from human sources, and the future history of all inoculated cases should be carefully watched.

I may now state the views I hold on the pathology of this disease, which are based on continuous work extending over nearly ten years. In the first place, I am convinced that we must recognize two forms of disease which result in the formation of cavities in the lungs. And, secondly, we must admit that one of these,—pulmonary phthisis,—occurring after broncho-pneumonia, is a purely inflammatory disease from beginning to end. Thirdly, we must recognize two distinct lesions in the lungs in acute miliary tuberculosis, so marked as to constitute two separate diseases. Fourthly, after due consideration, I think we must admit that it is highly improbable that the tubercle bacillus can in one case set up an acute inflammation, resulting in breaking down and destruction of tissue, and in another case in the same organ cause a new growth of fibrous connective tissue without any inflammation whatever.

The whole question seems to resolve itself into the relation of the tubercle bacillus to the disease. Not very long ago it was considered rank heresy to doubt for one moment that Koch's bacillus was the virus of the disease. But what is the position that Koch himself has taken? in announcing his remedy he distinctly states that it will have no effect on the bacillus. It seems strange, to say the least of it, that a man who had discovered the cause of a disease, and, after years of work, had found a remedy, should bring out one that had no action whatever on the cause, but only on the result, and which left out those cases where the cause existed in the largest numbers,—namely, necrotic cheesy masses. No reticular tubercle ever becomes entirely changed into a cheesy mass; some fibroid tissue is always left at the edges. This statement of Koch, therefore, I take it, shows that he recognizes those lesions which are composed entirely of broken-down inflammatory material, and in consequence he cannot believe in the unity of phthisis, as these necrotic cheesy masses contain myriads of bacilli, giving the characteristic color reaction. It is a well-known fact that in any consolidation in the lungs, however small, where caseation has taken place, a number of different micro-organisms are found. They are all sharply differentiated from Koch's tubercle bacillus by their reaction to staining agents, as tubercle bacilli are alone able to hold the red color when subjected to the action of an acid. This peculiarity is in some way associated with caseation, and it seems evident that this reaction is closely related to certain fatty materials.

If any ordinary bacteria be cultivated on solid culture media, and a thin layer of butter be placed on them, so that they are covered with it, these bacteria will show the same reaction as the tubercle bacilli; that is, they will hold the red stain when passed through acid. The same thing may be brought about by adding fatty matter to the culture media, but so much fat is required to do this that the medium will not remain solid. Bacilli are

found in smegma which have precisely the same reaction as tubercle bacilli, but when they have been cultivated on gelatin for some little time they lose it entirely. I made this statement at the annual meeting of this Society three years ago, and it has been abundantly corroborated since then. We may, therefore, consider that the reaction characterizing Koch's tubercle bacilli may be acquired from the fatty material in the caseation, where it forms such abundant growth that it evidently finds suitable pabulum. Now, if its presence in the consolidation of broncho-pneumonia, which has gone on to pulmonary phthisis, can be satisfactorily explained, it seems to me there is no possible reason for including this disease under the head of tuberculosis. We know that the ultimate ends of our breathing apparatus—that is, the farthest point the inspired air can reach—are the air-vesicles, and we know that these are small sacs, composed of flattened epithelial cells, which are joined by cement-substance to one another, and have small holes in this cement-substance, which communicate with the lymph-spaces outside. We also know that particles of carbon or soot in the air we breathe pass into the air-sacs, and through these openings into the lymph-spaces outside, from whence they pass on to the lymphatic glands, which, in people who have lived in large cities, are made quite black by them. Exactly in the same way a micro-organism can pass into the air we breathe, get into the lymph-channels, and then pass on to the blood.

In the circulation it would be carried throughout the body, and in all probability numbers of micro-organisms, or rather their spores, get lodged in this manner in the various organs. As long as the organs or tissues are healthy they can do no harm, as their function in nature is to feed on devitalized organic matter and digest it, in doing which they split it into simpler forms, many of which have toxic properties. That the spores of micro-organisms do exist in normal blood has been proved by a number of investigations, where the blood was first carefully tested and found free from formed bacteria, but an hour after the injection into the circulation of sterilized material, capable of setting up a chemical change in the blood, it was found to be teeming with them. In the consolidation of broncho-pneumonia the spores of various forms must be present. None of them can grow until this consolidation has lost its vitality. After this they can, and their action would be that they would simply set to work and devour this devitalized consolidation, increasing enormously in number as they did so, having now developed into their adult condition ; and by their action on the consolidation I think they bring it into a softened condition, in which it can be passed off by the air-passages, leaving a cavity behind. This seems to me to be a complete explanation of all the processes that take place in pulmonary phthisis, and the explanation also of the inflammatory form of acute miliary tuberculosis, or disseminated catarrhal pneumonia, as Hamilton named it before the discovery of the tubercle bacillus, in which disease there are always a large number of tubercle bacilli in the caseated areas. I think it is most important that we should realize the different stages of this disease, and how it differs from tuberculosis, as, if we have this knowledge, it is not a difficult matter to cure it if taken early enough.

We have an inflammatory condition of the lungs, and if we can only stop this inflammatory process before any portion of the lung has lost its vitality, we can bring it back to its original condition by adopting any means that will remove the inflammation and keep up the strength, especially of the respiratory muscles, and yet we sometimes see croton-oil blisters applied over the chest, entirely depriving the respiratory muscles of their action on the lungs beneath.

Tuberculosis is a much more formidable disease. It commences insidiously, and is often far advanced before its presence can be detected. Consisting, as it does, of a new growth of fibroid tissue derived from the connective tissue of the lungs, it is evident that a good deal of this new tissue may be formed before it can be detected by physical examination. It generally commences in the apex of the lungs, and grows downward. It has this peculiarity, that, after growing to a certain size, which varies according to the chronicity of the process, the centre undergoes a necrotic change and loses its vitality. Although one of these tubercular masses looks large to the naked eye, and appears to be homogeneous, it is in reality made up of an aggregation of tubercles, and this tubercular process is always progressing on the outside while the centre is breaking down. Little tubercles in the earliest stage can be found in the periphery. These tubercles can grow rapidly, as is shown in acute miliary tuberculosis, where the lungs are found filled from apex to base with them, in all stages, but of

small dimensions; also in tubercle of the choroid, where the growth is the same. Whatever the cause may be of this condition, it is something which must be carried throughout the lungs by the circulation in acute miliary tuberculosis, but which must have some other distribution in those more chronic forms where the apex is the first part affected.

Dr. Shurly and I have now been working together on this subject for three years, and we have gone most carefully into all the conditions found. Our investigations have resulted in the differentiation I have just stated, and also in causing us to consider the tubercle bacillus more as an accessory than an actual factor in the production of tuberculosis. My own view, that there was some morbid product responsible for the irritation resulting in this new-growth tubercle, was formed before I came to this country, and on my arrival here I was glad to find that Dr. Shurly, from work he had been doing in this direction, was also of the same opinion. We procured monkeys, and carefully studied the disease processes in them, and, having satisfied ourselves that we had a morbid chemical substance to deal with, we set to work to try to neutralize it. After numberless trials, we found that we could do this with iodoform, but that substance set up a fatty change in the liver, and had to be discarded. We afterwards found that iodine would prevent the formation of tubercle in inoculated animals, and that chloride of gold and sodium would render tubercle bacilli innocuous, without, however, killing them. This seemed to be the result we were aiming at, as we always considered that the so-called pure cultures of tubercle bacilli were not really pure, but, as in the case of the jequirity bacillus, contained some morbid product introduced from the original source. We made a large number of experiments on animals by inoculating them with tubercular material, leaving them for a week, and then putting them under treatment.

We used in the first place monkeys, but they were too expensive, as we required large numbers. Guinea-pigs were, fortunately, found to give exactly the same reaction, and they were afterwards used for all the ordinary experiments. We found that putting them under treatment a week after they had been inoculated with tubercular material confined the lesions to the sore at the seat of the inoculation.

We then tried putting healthy animals under our treatment for a week, and in some cases a fortnight, before inoculating them with tubercular material, and in these cases we prevented even the formation of an abscess at the seat of the inoculation.

We now considered that we were in a position to try our remedy on human patients, which we did with the most gratifying results. This investigation has been most thorough, and the results we have obtained were from a study of the disease in all its varying conditions. All animals have been most carefully examined during life and after death, and the results recorded, and when I state that over three hundred guinea-pigs and nearly one hundred monkeys have been used, besides a number of other animals, I think you will admit that we have not arrived at any hasty conclusions.

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*THE STATUS OF THE HYDROCHLORATE OF COCAINE IN MINOR SURGERY, AS BASED UPON THE EXPERIENCE OF PHILADELPHIA PHYSICIANS.**

By Lewis H. Adler, Jr., M.D.,† Philadelphia, Pa.

GENTLEMEN:—The subject which I bring before you this evening is one full of interest. It offers a field for study and investigation which is peculiarly attractive; for if, by the simple hypodermic puncture, we can inject a substance into certain portions of the human body, and thereby secure immunity from pain, or, at least, an alleviation from the sufferings of a minor surgical procedure sufficient to enable the patient to withstand the anguish of the same,—and no unpleasant symptoms or toxic effects be produced by such use of the drug,—we have at our command a remedy *par excellence* as a local anæsthetic.

Have we such a remedy in cocaine? I think so; and it is my object to prove this to be the case by quoting the opinions of a number of Philadelphia physicians respecting their experience with the drug.

Letters have been written to over fifty gentlemen of this city regarding their personal use of cocaine in minor surgery, with a request to make known their views as to its merits as a local anæsthetic and its range of utility in surgical practice. Replies have been received to fifty-one of these communications. Included in the list are the names of surgeons, gynæcologists, obstetricians, ophthalmologists, and

* Read in extract before the D. Hayes Agnew Surgical Society, March 6, 1891.

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throat and nose specialists. Certainly deductions drawn from the expressed opinions of such a large circle of practitioners of medicine must be accepted as correct and not open to dispute, representing, as they do, an extensive experience with cocaine, as well as a close and careful observation of its effects. Such being the case, allow me to present for your consideration extracts from these letters.

For convenience I have arranged the replies alphabetically.

1. Dr. D. Hayes Agnew writes: "Cocaine is very well adapted to many cases of minor surgery, such as the removal of foreign bodies from the surface of the eye; caruncles from the female urethra; in allaying the irritability of the urethra before passing sounds or bougies; in the ligation of small hemorrhoidal tumors; in the extirpation of small tumors from the mouth, and in operations on the nasal cavities; in the removal of small tumors on the surface of the body, particularly if, after the hypodermic injection of the drug, the circulation in the part can be interrupted.

"Extreme caution in the use of the agent is to be observed when the circulation cannot be controlled; especially is this the case when any considerable amount is required.

"These are some of the uses of cocaine, though by no means the range of its utility in minor surgery."

2. Dr. John Ashhurst, Jr., replied: "My experience with the drug as a local anæsthetic in minor operations has been quite favorable. I have found it very useful, applied hypodermically, in the removal of small tumors, moles, etc., and in the receiving ward of the Pennsylvania Hospital, this city, it is constantly employed in amputation of fingers."

3. Dr. B. F. Baer: "I have used cocaine but very little in my practice. Occasionally I find it of service in cases of hyperæsthesia of the vagina for purposes of examination. I do not perform any plastic operations upon the vagina under cocaine anæsthesia. Once, in a case of emergency, I performed an abdominal section with the drug as the anæsthetic."

4. Dr. J. M. Baldy: "In minor gynæcological operations cocaine has a field of usefulness. It is especially adapted to small operations, such as take but a few moments for their performance, and can be done in your office. For instance, in a highly inflamed and irritable urethra, in which it is desired to pass an instrument; in those cases where one wishes to remove vascular vegetations at the meatus urinarius; caruncles or hemorrhoids of the urethra.

"In the more serious and prolonged operations, such as dilatation of the urethra or os uteri, and in the cutting operations on the cervix and the perineum, I do not think that the local anæsthetic, cocaine, is so good as the general one, ether.

"It is true that many of these operations could be done under cocaine without pain to the patient, but there is a moral objection to its employment in these cases. When the drug is so used, the patient is continually on the watch for something to happen, and the nervous tension is, in a nervous woman, sometimes extremely exhausting. Again, the muscular system is not sufficiently relaxed to make the necessary manipulations easy, it being remembered in what a narrow limit of space the work must be done, even under the most favorable influences. In these cases cocaine anæsthesia, in my experience, has much prolonged the operation and rendered it more tedious.

"Another reason why I think a patient should be rendered oblivious to her surroundings in such instances is that a woman does not like the idea of having a number of men inspecting and manipulating her sexual organs. Therefore, as a matter of delicacy, both to her and the attending surgeon, it is well that she be completely anæsthetized.

"A combination of such reasons has induced me to discard in my practice local anæsthesia whenever I can employ ether."

5. Dr. George M. Boyd: "Applied locally to a serous or mucous membrane, or to any portion of the body where the skin is denuded, cocaine, in my experience, has never failed to produce its anæsthetic effect.

"I have amputated fingers under the local effect of the drug, the patients in the majority of cases experiencing no pain, although some apparently did.

"I have recently employed it in several cases of urethral caruncles with most satisfactory results.

"As an anæsthetic, I always feel uncertain as to how much I can depend upon it."

6. Dr. T. Hewson Bradford: "I have used cocaine but seldom, for, when an anæsthetic has been required, ether has been my preference."

7. Dr. J. Solis-Cohen: "I find hypodermic injections of cocaine amply sufficient for tracheotomies, laryngo-fissures, and the removal of cystic and other tumors exterior to the larynx. Injected beneath the mucous membrane, almost equally efficacious, and often fully so, in resection of tonsils and removals of portions of the palate, pharynx, etc., for epithelioma and

tuberculosis; also for removal of lymphoid growths from the vault of the pharynx, adenomas of the soft palate, and many cases of circumscribed nasal and pharyngeal neoplasms.

"Topically applied to the mucous membrane, it is of great service in operations of all kinds within the nasal passages in most instances; but in some, especially those requiring repeated operations, little by little, it actually increases the sensitiveness of the part.

"Some patients are particularly susceptible to prostration by cocaine. I find this usually overcome by a dose of whiskey and water *before* applying the drug. I have rarely seen collapse unless I have been silly enough to apply cocaine to a bleeding surface. I have reached the conclusion that it is injudicious to reapply the drug once an incision has been made into bleeding tissues."

8. Dr. John C. Da Costa: "Where the circulation can be controlled,—as by a ligature or rubber band, as around the finger,—cocaine is an admirable local anæsthetic.

"In the operation for circumcision I use cocaine, to the exclusion of other anæsthetics. Here the circulation can be controlled, and the drug seems to utterly abolish pain.

"In gynæcology the drug is uncertain in its effect. In the spring of 1886 I had a series of cases that could not bear any general anæsthetic. [Cases of operation on the perineum and cervix uteri.] Cocaine was used hypodermically, and the surface as denuded touched with a solution of it.

"In about one-third of the cases there was no pain experienced during operation; in about one-third of the cases there was a deadening of the pain, but not abolition of it.

"In the remaining third of the cases there was apparently no impression made from the use of the drug.

"In abdominal work, *before operation*, I do not see how it can be useful; but *after operation*, and given by the mouth, it is probably one of the best remedies we possess to control the nausea from ether, to tone up the heart, and to start the activity of the kidneys.*

"I have never seen any bad results follow the use of the drug."

9. Dr. G. G. Davis: "I have not had that unbounded faith in the capabilities of cocaine that some surgeons have displayed. In my experience it has only been of service in dealing with affections of the cornea and mucous surfaces, as ulcers, etc.

"I have on two occasions seen what might be thought to be marked depression following the use of cocaine,—once in a case where an exostosis was being removed from the nose, and another time when the drug was applied to an ulcer.

"For operations in the nasal cavities, I employ a ten per cent. solution of cocaine, a piece of absorbent cotton being wet therewith and applied to the part for about five minutes. For the cauterization of venereal sores, apply a piece of cotton, wet with a four per cent. solution, to the part for a few moments. In cases of hemorrhoids, fifteen grains of cocaine to an ounce of tannic acid ointment is found to be quite useful. In ophthalmic work, I use the drug quite sparingly, especially in the removal of foreign bodies, a single drop of a two or a four per cent. solution being sufficient.

"I am not in the habit of using cocaine hypodermically, as I prefer the primary stage of general anæsthesia for slight troubles, and complete anæsthesia for the more serious operations."

10. Dr. Harry C. Deaver: "In all minor surgical operations, where I am able to cut off the circulation by means of an elastic ligature, and in operations on the mucous surfaces,—as in internal urethrotomy,—I employ cocaine as a local anæsthetic.

"It is very satisfactory in anæsthetizing the tunica vaginalis, in the radical treatment of hydrocele by injections of the tincture of iodine.

"I find it very efficacious in circumcision and in finger amputations; undoubtedly, in these latter cases, it is the anæsthetic *par excellence*. I never have had any unpleasant symptoms follow its use."

11. Dr. John B. Deaver: "My experience with cocaine is confined to its use in the urethra, where I use it all the time, doing internal urethrotomies, etc., under its influence. I have never had any unpleasant effects from the use of the drug."

12. Dr. Thomas H. Fenton: "In ear cases, the use of strong and even of weak solutions of cocaine has, in my experience, been occasionally attended by marked systemic disturbance. A very important point, not usually noted, is that in cases of foreign bodies in the cornea, where cocaine is used, the operator, unless very skilful or very careful, is apt to remove more of the epithelium, and, indeed, of the substance of the cornea, than should be done.

"Since the introduction of the drug, and its general employment in cases of superficial operations on the eye, I have seen many cases in

* See paper by Dr. Da Costa, "Transactions of the Medical Society of Pennsylvania for 1887," pp. 113–115.

which the eye has been roughly handled, as it were, and where the reaction and actual tissue-changes were more extensive than I have observed at an earlier time. It can readily be seen that with the employment of a local anæsthetic of such power, dexterity is no longer at a premium. In my eye clinic I always direct my assistants to use only a minimum amount of the solution. Reaction is thus rendered more prompt, and the operator is less likely to impose prolonged manipulation upon tissues which are illy prepared to stand any but the most judicious treatment.

"In the ear one is apt also to do more than is perhaps allowable, with the result that the after-effect is often surprising to both surgeon and patient."

13. Dr. L. Webster Fox: "Cocaine is simply invaluable in ophthalmic surgery. Since its introduction I have used it in every operation known to my specialty, and I find that it takes the place of ether and of chloroform in all operations, excepting for enucleation of the eyeball and iridectomy for acute glaucoma.

"My explanation, why it renders an eye more sensitive to touch in acute glaucoma, is that, the eyeball being hard and congested (the internal pressure being so great as to prevent endosmotic action between the fluids), the cocaine remaining on the surface of the mucous lining of the eyeball acts as an irritant; hence, instead of relieving pain, it increases it.

"For enucleation, cocaine does not penetrate to the deeper tissues,—muscle attachments, etc. I have removed one eyeball under cocaine anæsthesia, but would not repeat the experiment. While the removal of the eyeball is not an extremely painful operation, its moral effect produces a serious shock to the nervous system; therefore, in such cases, ether is much to be preferred.

"For cataract extraction, iridotomy, strabismus, and tattooing the cornea, cocaine is the *ne plus ultra* of anæsthetics."

14. Dr. E. Baldwin Gleason: "It should be borne in mind that the mucous membrane of the respiratory organs, thin and vascular as it is, seems especially well adapted for osmosis and exosmosis, the absorption or transudation of either gases or fluids. Hence the constitutional effects of cocaine are much more quickly perceived when a small quantity of a weak solution of the drug is sprayed upon the nasal mucous membrane than when an equal amount is taken into the stomach. However, the absorption of cocaine is, in a certain sense, a self-limited process. When a strong solution is applied, a small quantity is absorbed, and produces an immediate contraction of the vessels; so that the mucous membrane becomes almost completely ensanguinated, after which absorption goes on very slowly. A weaker solution of cocaine produces contraction of the blood-vessels more slowly, and hence a larger amount of it is absorbed, and it penetrates the tissues to a greater depth. For this reason the application of a pledget of absorbent cotton, saturated with a twenty per cent. solution of cocaine, within the nose, will produce a more rapid but less deep and profound anæsthesia than when a four per cent. solution is used in a similar manner. For the same reason, a pledget of absorbent cotton, saturated with the stronger solution, will remain inside the nose a long time without producing constitutional effects, while an equal amount of the drug sprayed upon the entire nasal mucous membrane, in a weak solution, manifests its constitutional effects almost immediately.

"When applied to the nasal mucous membrane, a solution of cocaine not only produces local anæsthesia, but also contraction of the blood-vessels and shrinking of the so-called erectile tissue. It also diminishes secretion and the osmosis of fluids. Hence it has a therapeutic value in the treatment of nasal disease, as well as a use in nasal surgery as a local anæsthetic. In nasal hydrorrhœa, astringents increase rather than diminish the discharge; it may be, however, promptly checked by the application of a four per cent. solution of cocaine. In acute rhinitis, the discharge and the occlusion of the nasal chambers, by swelling of the turbinated bodies, is at once relieved by the application of a four per cent. solution of cocaine, and this effect of the drug may be kept up for several hours by spraying the parts with a four per cent. solution of analgesin, which, although it causes contraction of the blood-vessels and turbinated tissues in the same manner as cocaine, seems rather an irritant than a local anæsthetic. Hay fever may be treated by ordering the patient to wear constantly small pieces of fine-meshed sponge, saturated with a solution of cocaine, within the nostrils, which will not only relieve the stenosis and diminish the discharges, but will filter, as it were, the inspired air. Of course such treatment is simply palliative, but it gives great satisfaction to sufferers during the attacks of hay fever.

"The following points should be borne in mind when cocaine is used within the nose:

"1. Local anæsthesia is best and most safely secured, not by spraying the entire Schneiderian mucous membrane with a solution of cocaine,

but by applying the solution on absorbent cotton simply to the field of operation.

"2. Within certain limits weak solutions produce deeper and more profound anæsthesia than the stronger, but require a somewhat longer time to manifest their full effects, a four per cent. solution being probably the most satisfactory strength for obtaining local anæsthesia within the nose.

"3. Solutions of cocaine, when applied to inflamed mucous membranes, do not manifest their effects as quickly and completely as when no inflammation is present.

"4. Unless the effects of cocaine are maintained for a considerable time, by repeated applications of the drug, its use locally is followed by increased congestion and inflammation when inflammation is present already.

"5. When cocaine is used to produce a sedative effect and to diminish the discharge in acute rhinitis, but more especially in nasal hydrorrhœa and hay fever, it should be employed in solution rather than as a 'snuff,' made from cocaine crystals powdered with other substances, because the mechanical irritation of a powder tends to increase the existing inflammation and the discharge, and to counteract to that extent the effects of cocaine.

"6. When a solution of cocaine is used within the nasal chambers, care should be exercised to prevent its reaching the pharynx, where it quickly suppresses the discharges and produces a most annoying sensation of dryness, which the patient vainly tries to relieve by frequently swallowing saliva. Except as an application to the tonsils, cocaine is not well adapted for use as a therapeutic application within the pharynx.

"7. When it is necessary to prescribe a solution of cocaine for a patient to use himself within the nose, some precautions should be adopted to prevent him forming the cocaine habit. It is well not to inform him of the name and nature of the drug given. The morphine habit has been established by frequently sniffing a solution of the drug into the nose, for the relief of pain, 'catarrh,' etc., and in such cases a solution of cocaine gives so much greater relief from the local symptoms and so great a feeling of buoyancy, not only by the constitutional effects of the drug, but also by the dilated nostrils supplying an increased amount of oxygen, that the habit of applying cocaine solutions inside the nose is soon established and only with great difficulty abandoned."

15. Dr. William Goodell: "I have been disappointed so frequently in the results of cocaine anæsthesia that I now never use it in gynæcological operations."

16. Dr. W. F. Haehnlen: "My experience with the use of cocaine has been principally confined to gynæcological and to obstetrical practice, although I have used it in the various minor operations of general surgery and with moderately good results, provided strong solutions were employed. By strong, I mean five, eight, and ten per cent. solutions. The two and four per cent. solutions have, in my hands, given very little satisfaction.

"The gynæcological cases in which the drug is indicated are those of beginning cystic degeneration of the cervix uteri, where evacuation of the cysts causes pain. If the vaginal cervix in such cases be thoroughly painted with a ten per cent. solution, the cysts may be punctured without the slightest pain. Again, operations upon the vaginal walls for prolapse, cystocele, and rectocele may be fairly well done under the influence of cocaine; but, of course, not so satisfactorily as with complete anæsthesia under ether; but where patients will not consent to taking ether or chloroform, or, where those drugs are contraindicated, cocaine plays an important *rôle* as an anæsthetic. For the treatment of urethral caruncle I can speak very favorably of strong cocaine applications, having had the happiest effects in such cases, whether cauterization or excision of the same was done. For the removal of painful *caruncul*æ *myrtiformes*, cocaine, liberally applied, renders the offending bodies anæsthetic.

"For the gynæcological examination of highly nervous and hyperæsthetic women, I have found the application of the drug to the vaginal orifice to be of service, especially where the speculum has to be used. In short, many of the various gynæcological manipulations, consequent upon diagnosis and treatment, may be rendered easier and less objectionable to the patient when cocaine is applied.

"In obstetrical practice I have found cocaine of considerable service, but its range of application therein is very much more limited than in gynæcology.

"The points I would lay stress on are the strength of the solution used and the condition of the parts to which it is applied, for unless the tissues intended to be anæsthetized be in such a state that the peripheral nerves may be reached by the drug, the effect is scarcely perceptible. Cicatrices constitute an example of a condition in which cocaine is inefficient."

17. Dr. Richard H. Harte: "On the whole my results with cocaine have not been so satisfactory as many of its advocates in their claims

for the drug had led me to anticipate, except on mucous surfaces, where it may be employed with considerable advantage. As to injecting it hypodermically for its local action, I think its use is always fraught with danger, owing to the unusual idiosyncrasy of some persons to succumb to its toxic effects. To my mind the only portion of the body where it should be thus employed is where the entire circulation can be cut off, and, when restored, the hemorrhage is sufficient to wash out any excess of the drug, and thus prevent its absorption."

18. Dr. A. Hewson: "I have used cocaine with great advantage in minor surgery. In cases of phimosis, I have removed the redundant foreskin without the slightest pain to the patient and with no interference in the after-result. My method of procedure in such cases is to constrict the root of the penis by means of an elastic ligature. Forty minims of a four per cent. solution of cocaine are injected subcutaneously into the foreskin. In a few moments the incision may be made without pain to the patient. Before coaptating the skin and mucous membrane, the ligature is removed, and free bleeding encouraged for a short while, in order to get rid of as much of the cocaine as possible. In less time than a week the union of the part is complete.

"I have used cocaine also with marked good effect in hyperæsthetic urethræ, with an existing stricture or strictures, to relieve the pain in introducing a sound or bougie. Also, after making deep urethral applications of ten or twenty per cent. solutions of argentic nitrate to granulating points, I have found cocaine to answer a double purpose,—of neutralizing the effect of the silver and in relieving the pain produced. Cocaine has failed in my hands in operations on fistula *in ano* to give the result expected. In amputation of fingers and phalanges I have had very good results, but in all such cases emphasis must be laid upon the use of the *elastic ligature* before the hypodermic injection is made, and upon the danger in the administration of the drug when such cannot be done.

"In all cases I use either a four or a six per cent. solution of cocaine, of which solution I use from forty to eighty minims, according to the character and duration of the operation."

19. Dr. Albert G. Heyl: "The power possessed by cocaine of obtunding not only the neural epithelium, but probably also the conducting tubules of the sensory nerves, has made it a very important adjuvant for the ophthalmic surgeon.

"The sclero-corneal epithelial covering of the eyeball is an exquisitely sensitive organ, and as it is a very common locality for the lodgement of foreign bodies, cocaine instillations are of the greatest service, enabling the operator to pick at will with the needle. So, also, when it is desirable to scarify the circumcorneal vessels,—as in certain cases of pannus,—cocaine is very useful.

"In tenotomy of the recti muscles, as for squint, I have known it to be employed, obviating the employment of ether, and with very little, if any, pain. The use of the drug in such cases enables the surgeon to gauge the immediate effect of the operation, which may be of considerable importance, as bearing upon the success of the same. In enucleation of the eyeball, where the patient does not easily come under the influence of the general anæsthetic, or when it is desirable to shorten the duration of the operation, the instillation of cocaine solution enables one to begin the same earlier than would otherwise be possible, and there surely is no reason why the drug should not be always used in enucleations of the ball, with this object in view. In cataract extraction, I have always used cocaine unwillingly. In the first place, because I have known in the practice of others destructive inflammation of the eyeball to follow its use, and while it may be true that, had proper antiseptic precautions been used, no inflammation would have occurred, yet the thought clings to me that an agent which acts as cocaine upon the cornea may make the eye more liable to mycotic infection than it otherwise would be; in the second place, it has seemed to me that when any difficulty is experienced in the expulsion of the lens the previous use of cocaine enhances it. This is because of the drug's action on the tension of the eyeball.

"As a remedy in the pain of inflammation it is too fugacious to be of value. One more experience may be added. Every one who has used cocaine instillations in the eye may have noted the flaccid condition of the cornea which follows. It may be dimpled by slight pressure of the needle. This phenomenon may be analogous to the shrinkage of the turbinated erectile tissue from the application of cocaine, a fact of practical value in operations in the nasal cavities; and some time since, noticing one of our hospital residents endeavoring to reduce a paraphimosis, I ventured to suggest that cocaine solution be sprinkled over the glans penis. This was done, and the reduction easily accomplished."

20. Dr. B. C. Hirst: "I use cocaine but very little. I tried it as a local anæsthetic

during labor for a while, but have not employed it for that purpose for some time. I also used it several times in opening mammary abscesses, but it is not nearly so satisfactory as ether, which I now always prefer. At present I employ cocaine only in the primary repair of the perineum, and not always then, for the parts are benumbed by pressure and less sensitive than usual. When I use it in this way I place a pledget of cotton, wrung out in a solution (from four to ten per cent.), in the wound, while I prepare the needle and the thread."

21. Dr. E. W. Holmes: "Cocaine does not produce its effect through the unbroken skin; it there has to be used hypodermically, in which case the puncture of the needle gives almost as much pain as that of a bistoury. While its anæsthetic properties have been amply confirmed, cocaine has not attained the practical utility expected of it, excepting in mouth, nose, throat, and eye operations, in which cases it is available both for operative purposes and for examinations. Even upon mucous surfaces it acts slowly, and some dissatisfaction is at times experienced because the operator has not appreciated this fact; for instance, I have found that it took ten minutes to thoroughly benumb a tonsil."

22. Dr. William Barton Hopkins: "I have found the anæsthetic properties of cocaine satisfactory as applied to mucous membranes; unsatisfactory as applied to the unbroken skin. Its effects are too superficial to be of value. It will not, in my experience, prevent or much relieve pain incident to the incision of deep abscesses, anal fistulas, or small growths; indeed, I seldom use it now except, of course, in operations on the eye, and for its therapeutic value in certain afflictions of the mucous membranes."

23. Dr. W. W. Keen: "I have very freely used cocaine in minor surgical practice, and have never had the least trouble with it. In two or three instances it has not seemed to diminish the pain, whether because I did not wait long enough or because of some peculiar idiosyncrasy, which seems unlikely, I do not know. I have always used it in a four per cent. solution. The cases in which I have used it have been various instrumental processes in the male and the female bladder, for the extirpation of warts, ingrowing toe-nails, small tumors, epithelioma of the lip, nasal polyps, tonsillotomy, etc. In all such cases it is quite a routine practice with me."

24. Dr. Edward Martin: "Leaving aside its medical uses and its application to surgical procedures about the mouth and naso-pharynx, I have frequently employed cocaine as a local anæsthetic in cases falling under the following heads:

"1. Circumcision.

"2. Excision of small tumors.

"3. Avulsion of nails.

"4. Meatotomy.

"5. Passage of sounds when the urethra is unusually sensitive.

"6. Minor operations about the rectum.

"The circumcision can be rendered absolutely painless by injecting twenty drops of a four per cent. solution along the line of section. About the frænum the sensitiveness is greatest, hence several drops of the solution should be injected here. The needle is entered a quarter of an inch, and a drop or two is injected. It is then entered deeper in the proposed line of cutting, and a further injection is made, till one side is entirely anæsthetized; then the other side is treated in a similar manner. A rubber band should be placed around the root of the penis immediately after the injection is completed. After the stitches are passed, but before they are tied, this band should be removed, and free bleeding should be encouraged, that as much of the drug as possible may be carried out of the system.

"In removing ingrowing nails, the injection is carried in along the matrix, and is deposited, a drop at a time, as the hypodermic needle is slowly inserted, in order to anæsthetize the tissues in front of the needle before it is thrust in more deeply. Meatotomy is rendered entirely painless by the application for two minutes of a pledget of cotton dipped in a twenty per cent. cocaine solution.

"For the passage of sounds, not more than a grain and a half of cocaine should be used, preferably in a four per cent. solution. This should not be kept in the urethra more than two minutes.

"In rectal operations I employ a twenty per cent. solution, applying it sparingly by means of cotton pledgets.

"In all operations, such as are mentioned above, the anæsthesia produced is absolutely satisfactory, and, except in cases of marked idiosyncrasy, the danger of toxic effects is exceedingly slight. The first insertion of the hypodermic needle is, in inflamed regions, sometimes painful. It is stated that this may be avoided by soaking the positive sponge electrode of an ordinary faradic battery with a ten per cent. solution of cocaine and applying it to the skin to be anæsthetized, the negative elec-

trode being applied to any indefinite surface. With this method I have no experience."

25. Dr. J. Ewing Mears: "My experience with cocaine has been favorable. I have used it in operations upon the mouth, nose, vagina, and urethra, and in all instances I have derived beneficial results more or less marked. As a rule, I employ a four per cent. solution, and I have never met with untoward effects."

26. Dr. Thomas G. Morton: "Although I have used cocaine very extensively, yet I find at this time the range of its practical utility is less than formerly. The injection of the drug into the urethra is attended with so great danger that I have long since abandoned its use in operations upon this locality. I never now inject it subcutaneously for similar reasons. In ophthalmic surgery it would be very difficult, if not impossible, to get along without it. In the extraction of cataract, tendon section, removal of growths and foreign bodies, and in other minor operations upon the eye, it is invaluable. The same may be said in regard to many aural and nasal operations.

"In exploration of the larynx and in operations in this locality, cocaine is indispensable. In operations about the anus, such as fissure, hemorrhoids, and fistula, cocaine has not proved satisfactory. After iliac colotomy, the drug acts most satisfactorily in the early dressings, when more or less manipulation of the exposed bowel is necessary.

"In painful ulceration of the skin or the mucous membrane, cocaine often serves an admirable purpose. I am also partial to its use in painful conditions of the fingers and toes, as found in certain forms of diabetes. I seldom employ a greater strength of the drug than a ten per cent. solution."

27. Dr. Thomas S. K. Morton: "My employment of cocaine has not been very extensive. This is accounted for in part by what I regard as the limitations of its application; and, again, by its acknowledged dangers in overdose and in certain susceptible persons. Its use is practically limited to adults, and then only to such portions of the body where but a small quantity need be injected to secure anæsthesia, and where the circulation, both vascular and lymphatic, can be temporarily arrested. Thus, in minor operations upon the smallest locomotor extremities,—the eyelids and the penis,—it certainly has a field of usefulness in those persons who are not extremely nervous. Within these limits I have used the drug with satisfaction; but, from a surgical stand-point, I should always prefer general anæsthesia, because of the more thorough work that can be done, as the patient is then entirely under control. Again, unexpected complications often cannot be properly dealt with when operating under local anæsthesia. In operations requiring but a superficial incision, or thrust or two, I find freezing with rhigolene spray, ether, or ice much more efficacious and readily applied.

"I have noted in my own practice, and in that of many others, that it is the almost unexceptional rule for wounds to pursue an aseptic and satisfactory course when general anæsthesia has been employed; but that there are many exceptions to this course when either nitrous oxide, cocaine, or freezing mixtures are depended upon to wholly or in part annul the pain.

"The history of the drug in the hospitals of this city has been such as to prove it to be a dangerous agent in certain cases. Thus, I should not think of using it in any but the most superficial cavities, or in a urethra, where the possibility of fistula, false passage, or rupture existed. It must ever be used with caution and in very limited amount. The number of persons who are dangerously susceptible to its toxic influence I believe to be much larger than is generally conceded.

"Of course, in what has been written, I do not refer to superficial mucous membrane anæsthesia with cocaine. In eye work, its field of usefulness is almost unlimited; so, also, but in a less degree, in the nose, ear, and upon superficial surfaces, mucous or otherwise, prior to making painful applications or to scarification. But, where it must be injected into the tissues or a cavity, we should ever regard its use as not free from every serious danger."

28. Dr. E. E. Montgomery: "My experience with cocaine as an anæsthetic has been extremely limited. I have used it somewhat in operations upon the vagina and the cervix uteri, and in those cases in which it has been so employed it has been very satisfactory; they are not, however, of sufficient importance to justify a special report thereof."

29. Dr. Thomas R. Neilson: "My experience with the hydrochlorate of cocaine as a local anæsthetic lies chiefly in urethral work. I have very frequently injected a small amount of a four per cent. solution of the drug into the urethra before exploring it, when the patient was nervous or the canal hypersensitive. I very often use cocaine in solution when about to divide the meatus urinarius,—a procedure frequently necessary. My usual plan here is to secure on a match-stick a small pledget of absorbent cotton, and, having soaked the latter with

the solution, to insert it into the meatus, at the same time placing another small dossil of cotton, wet with the cocaine, upon the extremity of the glans penis. The anæsthesia produced has invariably been satisfactory.

"In the operation of internal urethrotomy upon strictures situated in the pendulous portion of the urethra, I have occasionally used cocaine, and mostly with satisfaction. I think, however, that care should be taken to inject into the urethra only a moderate amount of the solution, and that it should never be used when the stricture, which it is proposed to divide, is situated behind the peno-scrotal curve.

"In the hypodermic use of cocaine upon the male genital organs I have had two unfortunate experiences. The first was in a patient suffering from phthisis, in so advanced a stage as to preclude the use of ether anæsthesia, and upon whom it was necessary to operate for the relief of urinary fistulæ and abscesses in the scrotum, resulting from a stricture. There was also present adherent prepuce and 'pin-hole' meatus. The injections were made at a number of points in the scrotum where the fistulæ were to be laid open and in the prepuce along the line where I proposed dividing it. Altogether between forty and sixty minims of a five per cent. solution were injected, and in a moment toxic symptoms were manifested. These were not very intense, but still were sufficient to make me very anxious for a few moments. The second case was that of a gentleman upon whom I performed circumcision with anæsthesia produced by the injection of cocaine into the prepuce. The penis was tightly constricted with an elastic cord, and the points of injection were carefully made at the distal side of the line of circumcision. The amount injected was forty five minims of a four per cent. solution. Toxic symptoms of a very alarming character were produced in the patient, coming on at the conclusion of the operation,—that is, a few minutes after the injections were made and after the elastic ligature was removed. Reports of these cases will be found in the *University Medical Magazine* for November, 1888, and August, 1889, respectively.

"Outside of operations upon the genitalia, my experience with cocaine is not very extensive, but I have used it sufficiently often to enable me to say that I consider it available in operations of a minor character, where the part in question can be thoroughly constricted at the proximal side of the injections. The region of the anus and the genital organs seem to be especially dangerous for the hypodermic use of cocaine. Their rich lymphatic and vascular supply doubtless accounts for this.

"My experience with cocaine anæsthesia upon the mucous membranes, where I have repeatedly employed it, has been uniformly satisfactory."

30. Dr. Charles P. Noble: "I have found the hydrochlorate of cocaine a reliable and useful drug in a limited field of application. It is specially useful, administered hypodermically (grain one-half), to produce anæsthesia, for the removal of small tumors, especially sebaceous and fatty growths. I have used it to stop toothache, in the removal of stitches from the vagina or other mucous surface, and to lessen the sensibility of the vagina prior to examination. In short, whenever it is desirable to anæsthetize a limited area for a short time, cocaine can be relied upon as the anæsthetic. When a part is inflamed, and the anæsthetic action of cocaine is not so marked, and when the circulation is active and cannot be confined, its action is evanescent."

31. Dr. Richard C. Norris: "I have not had a very extensive experience with cocaine. In four cases of abscess of the vulvo-vaginal gland, about fifteen or twenty minims of a four per cent. solution of the drug made lancing painless. I have used stronger solutions (five or ten per cent.), applied on cotton, in stitching the primary laceration of the perineum. In two of six cases, of which I have kept a record, the application of the cocaine had but little effect. Twice I have used a four per cent. solution in cases of ingrowing toe-nails, and have been enabled to relieve the pain of elevating and cutting the same. I have combined the drug in the strength of thirty grains to the ounce, with salicylic acid, in an ointment to be used as a corn solvent, and it only had a slight effect in relieving the pain. I have injected ten minims of a five per cent. solution into the prepuce before circumcision in three cases, and the only pain complained of was that produced by the introduction of the sutures. I have frequently used a four per cent. solution of cocaine on cotton, in contact with venereal sores for a few minutes before cauterizing with the stick of silver nitrate or nitric acid, and have made the same application to venereal warts before excising them,—always with good results."

32. Dr. Charles A. Oliver: "My experience with cocaine may be expressed as follows:

"1. That it has been of the utmost benefit in many diseases and injuries of the external eye, where nerves have been exposed or irri-

tated. Thus it has proved of inestimable good in scratches of the corneal epithelium or of the conjunctiva, and in superficial ulcerations and nerve irritations of that organ.

"2. That it has been useful where it has become obligatory to employ any instruments of fixation or of precision during the necessary handling of timid or restless patients with irritable and painful eyes.

"3. That it has been of great value in preventing the immediate pain caused by the application of cauterizing agents and strong astringents.

"4. That it has been of the utmost service in the various surgical operations upon those parts of the eye which can be readily reached by the drug.

"Personally, I have never employed it intraocularly during operations upon the iris or the deeper structures of the globe, neither have I used it during enucleation, or in the graver and more prolonged operative procedures upon the tissues of the orbit, preferring to omit the injection of an uncertain foreign material into the eye in the first variety of cases, and making use of a general anæsthetic in the second class of cases.

"I have never had any constitutional manifestations of the drug, although I have used varying strengths (two per cent., four per cent., eight per cent., sixteen per cent.) quite freely about the eye. I prefer small quantities of fresh aqueous solutions of the hydrochlorate to be frequently made without the addition of any antiseptic, as such solutions never seem to irritate or cause any unpleasant local effects whenever used in the proper class of cases."

33. Dr. William H. Parish: "I have used cocaine in a number of minor operations chiefly pertaining to gynæcology. When relief from the pain of an operation follows the obtunding of the cutaneous or mucous nerves, cocaine is of especial value. Cocaine applied to any surface will not prevent the pain following incision or pressure that reaches the deeper tissues. The drug is of no practical value in the relief of the pain attending labor. In minor surgery it is more agreeable to the patient, and usually of less annoyance to the operator, to administer a general anæsthetic.

"The hypodermic use of cocaine, preliminary to an operation, is objected to by patients, and occupies more of the time of the operator than is the case with the administration of ether, and when it is so employed it is not always attended with complete prevention of pain, yet, when ether is contraindicated, cocaine becomes of great service.

"I have found the drug of decided value in overcoming temporarily the hyperæsthesia of the female genitals, as in vaginismus, permitting, under such circumstances, examination and treatment in my office, when etherization would be objected to by the patient, and its administration would be inconvenient to myself."

34. Dr. Theophilus Parvin: "In minor surgical practice I have used a solution of cocaine (usually eight per cent.), locally applied, in the excision of urethral caruncles and of prolapsed urethral mucous membrane. I have also used the drug before dilatation in vaginismus and in narrowed cervical canal. In the first three instances, the result has been most satisfactory; but in the last one its anæsthetic effect has been only of doubtful advantage."

35. Dr. Chas. B. Penrose: "Several years ago I used cocaine a good deal in minor surgery. My experience with it was not favorable, and now I very rarely use it."

36. Dr. W. G. Porter: "In regard to the use of cocaine, I would say that applied on mucous surfaces, I consider it the best local anæsthetic we possess. Of course, when applied to the sound skin, it has no effect; but, by gently scraping the epidermis, as we would for a vaccination, we can obtain its anæsthetic effect as well as on a mucous surface. Its use is not unattended by danger, as many fatal cases demonstrate. With its hypodermic use for surgical operations, I have had no experience; but on mucous surfaces, and in the extirpation of soft growths uncovered by skin, preparatory to the use of Volkmann's spoon, caustic, or the knife, I have had very satisfactory results with the drug."

37. Dr. B. Alex. Randall: "I have used cocaine with much, but not entire, satisfaction, since its value and limitations vary with the individual as well as the circumstances. Its ophthalmic use should be very cautious, the lids being kept closed after it is instilled to avoid drying of the epithelium; for it surely reduces the vitality of the corneal epithelium, leading at times to its exfoliation in blebs, or delaying the healing of corneal wounds, which depend largely on these cells for their prompt repair. Hypodermically, it has much control of bleeding as well as pain; but I hesitate to use it, except where the area can be largely isolated. In aural work its value is not so great; brucine excels it as an anæsthetic, and morphine and atropine as analgesics. Its most striking value is in the study and treatment of nasal conditions, where its power of reducing swelling and reflex irritability permits of diagnosis and topi-

cal treatment, otherwise impossible. Its unaided effect is of little value, but it opens up the nasal cavities to more lasting remedies. My only case of poisoning by it was from pledgets of cotton inserted in the nares."*

38. Dr. G. Oram Ring: "I have found the use of cocaine a most valuable addition, as applied to the treatment of diseases of the eye, the throat, and the nose. The instillation of a few drops of a two to a four per cent. solution renders it possible to perform any of the more frequent eye operations with comparatively little pain, those of a plastic nature and enucleations, of course, excepted. Even in those rare cases where ether is contraindicated in the performance of the latter operations, cocaine is a distinct aid.

"The exceedingly sensitive iris responds but feebly to its action. In the tenotomy of eye-muscles in children, I have found it usually necessary to administer ether. I have repeatedly noticed a smarting sensation, caused by the use of the drug, even when the cornea and conjunctiva have been previously rendered anæsthetic by its use. I have discontinued its use hypodermically in removing chalaza by the skin incision, because of the difficulty sometimes experienced in recognizing the position of the tumor after the distention of the lids following the injection. Anterior rhinoscopic examination I very rarely attempt to make without retracting the tissues by the use of cocaine. A thorough inspection of the turbinals is by this means rendered possible. In the more frequent nasal operations,—removing polypi, ecchondroses, and hypertrophies,—I prefer using a ten per cent. solution of cocaine, although the weaker solutions answer a very useful purpose. In straightening the deviated septa, cocaine, in my experience, has not produced a sufficiently pronounced anæsthesia, and in such cases I usually resort to ether. In the reduction of hypertrophied tonsils by the application of chromic acid or the galvanocautery, I rarely find the employment of cocaine necessary. This applies also to the operation of tonsillotomy."

39. Dr. Samuel D. Risley: "My experience with the use of cocaine in ophthalmological practice is a very favorable one. I employ, for the most part, a two per cent. solution. This solution I use habitually, not only to relieve pain in cases where surgical interference is necessary, but also to relieve irritation in abrasions of the cornea from accident or disease, and to aid the stronger mydriatics in securing a rapid and wide dilatation of the pupil, or alone, to secure a transient dilatation. I use the drug for all kinds of surgical interference about the eyes, except for plastic operations involving the eyelids, and for enucleation of the eyeball. One annoyance I have experienced from its use is the often severe smarting occasioned by the instillation of the most carefully-prepared solution, and, curiously, the drug is not competent to protect the eye against this. Another source of annoyance has been the frequent abrasions of the corneal epithelium following repeated instillations. I have, however, never witnessed any permanent injury from its use."

40. Dr. John B. Roberts: "I find cocaine of value in ophthalmic and in minor surgery. I use it in these cases quite frequently. In the operations for phimosis, ingrowing toe-nail, and the extirpation of small tumors, I find the use of the drug exceedingly satisfactory, as well as in the extraction of cataracts. I believe it to be important that the tissues upon which it is employed should not be alkaline. This point I have gained from reading, however, as I have not made any special study of it. I usually incarcerate the drug where it is possible to do so."

41. Dr. Carl Seiler: "I have carefully observed the action of cocaine, as used in my practice, ever since the introduction of the drug into surgical practice. My experience is, that the drug, in solution, not stronger than four per cent., is a local anæsthetic if applied to the mucous membrane; but that it has no action whatever on the unbroken skin. In operations upon the nose and the throat, I have used the drug with great success and satisfaction, so much so that now I can perform operations for the removal of hypertrophies or bony excrescences, without pain to the patient, where formerly I was obliged to employ ether or chloroform, and to suffer the attending loss of time and annoyance incident to the use of a general anæsthetic.

"The manner in which I use cocaine is to saturate a piece of cotton with the four per cent. solution, and introduce it into the nose, where I allow it to rest in contact with the mucous membrane, at the seat of the intended operation for five or ten minutes. I never employ the spray or instillation, because either of these methods causes absorption of the drug and the consequent systemic effect of cocaine-poisoning, which are frequently spoken of in the medical journals. The nasal mucous membrane, not being an absorbing surface, allows the cocaine to act purely as a local anæsthetic,

* See *University Medical Magazine* for April, 1889.

and no fear need be entertained of any toxic effects being produced. I frequently use cocaine as a diagnostic aid in order to determine whether a swelling in the nose is a genuine hypertrophy, or whether it is merely a tumefaction, due to an acute inflammation. In the former instance, the swelling will not be reduced in size, while in the latter case it will entirely disappear under the influence of the drug."

42. Dr. Geo. E. de Schweinitz: "Since the discovery of cocaine the vast majority of operations connected with ophthalmic surgery are performed without the use of general anæsthesia, and there is probably no branch of surgery in which this drug has a more useful application. It does not retard the process of healing after operation, and if properly employed rarely causes toxic effects. In addition to its power of benumbing sensation, through its influence on the peripheral trigeminal fibres, it probably possesses the property of constricting the blood-vessels and reducing intraocular tension. Under its influence there is some drying of the epithelium of the cornea, hence it is advisable not to use it for too long a period before an operation, or, if it is used, that the lids be kept closed until the moment of the operation. There are few contraindications to its use, and even in glaucoma, with the possible exception of advanced chronic types of this disorder, it may be instilled into the eye preparatory to operation. The use of cocaine as a collyrium in inflammatory diseases of the cornea and conjunctiva probably does not belong to your subject, but I cannot resist the temptation of saying that its employment in these forms of inflammatory disease is often a distinct disadvantage to the patient. It is true temporary relief by the production of local anæsthesia ensues, but very often corneal ulceration will be markedly aggravated, especially by prolonged use, and its injudicious application in these cases should be deprecated. This does not refer to the production of temporary anæsthesia in those cases of corneal disease where it is necessary to employ the actual cautery, the curette, paracentesis, or similar operations. Neither would it be contraindicated as a single application for the purpose of examination, or for temporarily controlling congestion, in order that such examination might be more thoroughly made. The occasional reports which have been published in regard to failure of operation on account of cocaine, are probably *post hoc* and not *propter hoc*. It is needless to point out that in every operation a perfectly fresh solution should be used, preferably made in distilled water to which some boracic acid has been added. If the globe of the eye requires operation, the solution is instilled into the conjunctival sac; if an operation upon the lids is needed, better results will be obtained if the area of operation is enclosed in a clamp before the hypodermic injection is given, thus preventing the drug diffusing itself too widely through the loose cellular tissue; if the tendon of a muscle is to be divided, as in tenotomy for strabismus, a drop of the solution should be injected with a pipette into an opening made into the conjunctiva and capsule of Tenon, before the tendon is taken up by the hook preparatory to its separation."

43. Dr. J. H. C. Simes: "My experience with cocaine has been favorable as well as otherwise,—that is to say, I have employed it with much satisfaction in minor operations, and with no untoward results. Again, I have had its use to be followed with the most disastrous results,—viz., death.* Therefore, I consider the drug a dangerous one; and, while in most cases in which it is used there may not be any unfavorable effect, the cases in which the effect is not favorable cannot be distinguished from those in which it acts favorably. In other words, what may be a perfectly harmless dose in one person may be a dangerous, if not a fatal, dose for another. In the employment of the drug I have restricted myself to the following rules: Never to use a solution stronger than five per cent. Never to apply it to a mucous membrane when it is abraded, lacerated, or cut. Never to use it hypodermically, if the region cannot be cut off from the general circulation by means of an elastic ligature."

44. Dr. A. L. Stavely: "My experience with cocaine has been eminently satisfactory. In injuries to fingers and to toes, requiring amputation, and in the opening of felons, I have found that where the circulation could be arrested in the part, its anæsthetic effect was all that could be desired; but in the extraction of toe-nails it does not answer so well. I have successfully removed sebaceous cysts and small lipomata without pain, and have found it to be of the greatest service in the extraction of foreign bodies from the cornea or conjunctiva."

45. Dr. Joseph P. Tunis: "In the surgical dispensary of the Episcopal Hospital I have seen solutions of cocaine employed hypodermically in thirty-six cases requiring amputation of a finger or of fingers, as well as in several other minor operations. After the drug was injected under the skin no pain was experienced. A boy, of 4 years of age, sat on his father's knee, and talked quietly to him while I removed a

* See the *Philadelphia Medical Times*, July, 1888.

mangled finger. Nervous, high-strung girls, after the primary incision was made, and no pain produced, were practically convinced of the anæsthetic power of the drug, and would witness the removal of a finger without a whimper. In only one case did I notice toxic effects of the drug. A girl of 14 had her index and second fingers severely crushed, accompanied with a deep tear of the palm. Two syringefuls of a four per cent. solution of cocaine were injected into the fingers after the loose application of an elastic ligature. Bleeding was not completely controlled. Giddiness, nausea, slight delirium, and embarrassed respiration soon followed the injection. About twenty minutes later her respirations were eight to the minute. Kept in the supine position, she rallied in about two hours, without further toxic symptoms. No medication was used. The cause of the untoward effect of the drug in this case I ascribe to the improper application of the ligature. Six syringefuls of the same cocaine solution, injected into three fingers, in another case, requiring amputation, produced no unpleasant result. In this latter instance, the circulation was properly controlled, and before the sutures were inserted free bleeding from the parts was encouraged."

46. Dr. Jas. Wallace: "My experience with cocaine dates almost from its introduction into surgical practice. It has supplanted the use of ether in nearly all the operations on the eye, and affords a satisfactory anæsthetic for the cornea and conjunctiva, and a partial one for the skin. I do not think of employing ether now for cataract extraction, iridectomy, strabismus, or for cystic tumors of the lids, except in children, where complete control of the patient's sensibility is rendered necessary. In inflammations of the cornea and iris, accompanied with pain, it is a valuable adjunct to other remedies; it increases the effect of atropine in dilating the pupil in iritis. In acute inflammations of the conjunctiva, a few drops of the drug will dissipate the congestion, as a rule, in a very few moments. Cocaine produces such complete insensibility of the cornea that the sections of this membrane in cataract extraction and glaucoma are rendered painless. It has little or no anæsthetic effect upon the iris, unless the iris is prolapsed, and the drug is dropped directly on it. At times it seems to have an injurious effect in producing opacity of the corneal epithelium. In prolonged operations upon the eyelids its effects are not sufficient for operative purposes. It is of no use in enucleation of the eyeball. I have seen no toxic symptoms follow the employment of cocaine. I use it in solutions of two and of four per cent. strengths. I prefer a freshly-prepared solution, for it is more than probable that cocaine deteriorates upon standing for any great length of time."

47. Dr. H. R. Wharton: "I frequently employ cocaine in trifling operations, and think very well of it. I have seen no untoward symptoms follow such administration. I seldom employ a solution stronger than four per cent."

48. Dr. J. Wm. White: "I do not use cocaine a great deal. Occasionally, in sebaceous cysts of the scalp and in small fatty growths, it is useful to prevent the pain of the skin incision. In larger operations it is not to be relied upon, in my opinion. In urethral cases I only employ it where I have to overcome unusual sensitiveness of the urethra to the passage of exploratory instruments. In the treatment of strictures, cocaine is unnecessary for meatotomy and for the decision of strictures within the first half inch. Urethrotomy, posterior to that point, should not be an office operation, and ether is preferable to cocaine. Where the latter drug is for any reason employed in the urethra, it is well to guard against its absorption into the general circulation by elastic constriction of the root of the penis. I have seen very alarming results from the use of urethral injections of cocaine, though I have never had a fatal case. I have found its employment, in the shape of lozenges, a good preliminary to removal of the uvula, to scarification or excision of the tonsils, and to the opening of tonsillar and pharyngeal abscesses. I have sometimes used it in cases where a single enlarged gland required excision and has superficial adhesions without deep ones."

49. Dr. De Forest Willard: "In all cases of surgery, where the mucous membrane is involved, I have found the use of cocaine eminently satisfactory. Many minor operations, some quite severe, can be performed with decided comfort to the patient under cocaine anæsthesia. But when the skin requires section, and when the subcutaneous tissues and muscles require division, I have not been at all pleased with the effect of the drug in annulling pain. Of course, in a member where the circulation can be controlled, the effect of cocaine can be greatly enhanced, and in those cases where ether and chloroform are absolutely contraindicated, it is a useful adjuvant in our work. The pain occasioned by the hypodermic injection is, however, in many instances, nearly equal to the operation itself, especially if a number of punctures are necessary."

50. Dr. Chas. Meigs Wilson: "I have used cocaine in a six per cent. solution in but two cases, both patients with lacerated perinei, and in each instance I failed by its use to completely control the pain of denudation."

51. Dr. James K. Young: "I consider cocaine one of the most important additions to our list of useful drugs made during the last quarter of a century. In my experience, it is most effective when applied to mucous surfaces and when confined within the operative area. In eye operations it is my custom to employ two drops of a four per cent. solution, allowing an interval of five minutes between the instillation of each drop. With this small quantity all the ophthalmic operations have been painlessly performed, except enucleation. In iridectomy a sensation amounting to the severity of a pin-stick has always been experienced. The first steps of an enucleation—the conjunctival section and tenotomies—may even be painlessly performed, but the section of the nerves cannot be performed painlessly under cocaine anæsthesia, and I always employ ether. As a local anæsthetic in applications of the electro-cautery to nasal operations, the most beneficial effect has been experienced. In operations involving the skin, unless the area has been included by a rubber band or clasp, failure to produce entire relief from pain has been the rule, so that in tenotomies I prefer the rhigolene spray, or the local application of ice and salt, preferring the latter. Cocaine-poisoning has appeared to me to occur most frequently where large venous sinuses quickly absorb the drug and carry it into the general circulation, as in the nose, rectum, deep urethra, etc., but it has been my good fortune not to have had a case of cocaine-poisoning. The advent of cocaine anæsthesia is still fresh in my memory, and during this period it has revolutionized ophthalmic and nasal surgery."

Such has been the experience with cocaine of the gentlemen whom I have consulted. My own personal experience with the drug has been confined to the amputation of fingers and of toes; to the removal of ingrowing toe-nails; to the extirpation of small tumors, such as sebaceous cysts of the scalp, lipomata, etc.; to the removal of foreign bodies embedded in the cornea; to relieve the pain induced by the scarification or excision of the tonsil; and, finally, to relieve the excessive irritability of the urethra before the passage of an instrument. I have employed cocaine for its local anæsthetic effect in such instances as have been enumerated, in over one hundred cases. A four per cent. solution of the drug has been the strength invariably employed. In cases requiring amputation for injury, the part has been rendered aseptic, after which an elastic ligature is made to encircle the extremity. This ligature is preferably a piece of rubber tubing, for the reason that more uniform constriction is obtained, with less damage to the soft tissues. Due care is observed to see that the hypodermic syringe and needle are perfectly clean, after which the solution of cocaine is injected, first into the tissues through the wound, and subsequently through the skin. This procedure is adopted for two reasons,—to avoid the pain of a primary puncture into the skin, which is a very sensitive structure; and to make use of this sensitiveness, if it exists after the cocaine has been injected through the wound and has been allowed a few moments' time to exert its anæsthetic effect, in order to determine whether the part is sufficiently anæsthetized to permit the completion of the operation. From twenty-five to forty minims of the solution are injected at various points around the seat of the operation. From three to five minutes is sufficient time to wait for the action of the drug. Upon the completion of the amputation, and before the sutures are tied or the hemorrhage is controlled, free bleeding from the stump is encouraged, the object in view being to get rid of as much of the unabsorbed cocaine as is possible. Cocaine used in this way has, in my experience, always proved efficient for the entire relief of pain in suitable cases where a local anæsthetic was indicated. I have yet to experience any untoward effects from the use of the drug.

To sum up the status of the hydrochlorate of cocaine, as based upon the experience herein represented, it will be more convenient to consider separately its use in the various fields of minor surgical practice.

1. *In minor surgery*, cocaine, when used hypodermically, is of value in all operations in which the circulation can be temporarily arrested, in order to prevent undue absorption of the drug, and in which free bleeding can be encouraged at the completion of the operation previous to the tying of the sutures, to allow as much of the unabsorbed cocaine to be washed out as is possible. Attention paid to these two essential points will, as a rule, obviate any untoward results from the use of cocaine employed hypodermically for anæsthetic purposes. It is likewise important to make use of freshly-prepared solutions, as otherwise the formation of fungi is liable to occur and the preparation to

be spoiled. To prevent this alteration, antiseptic agents are added, the best one being boracic acid, as it is the least irritating. Such a solution usually consists of about twenty grains of cocaine and ten grains of boracic acid, dissolved in an ounce of distilled water. A preparation of this character has been used by the writer with perfectly satisfactory results, even when it has been over two months old.

Another point of considerable importance in using cocaine hypodermically is to make use of a perfectly aseptic syringe; frequently, in cases where the drug is so used and suppuration follows, it is the fault of want of cleanliness in this particular, and not to the employment of the drug.

A four per cent. solution is as strong as need be used for hypodermic injections. The principal advantages in using a solution of no greater strength are, that the anæsthetic property of cocaine can be made to reach to a larger area with a less amount of the drug than is the case when a more concentrated one is employed; and, furthermore, the dilution of the drug renders it less liable to produce toxic symptoms.

When the circulation cannot be controlled, extreme caution must be observed in the use of the drug, especially is this the case when any considerable quantity is required.

In anal work, cocaine is not of much use as a local anæsthetic; when so used it must be employed cautiously. It is of no use in obtunding the pain of fistulous tracts or of fistulæ *in ano*. Toxic symptoms are apt to ensue when the drug is employed in this region. The rich lymphatic and vascular supply of the part probably accounts for this fact.

For the purpose of controlling the circulation, a piece of elastic tubing is to be preferred to a solid ligature, as less damage is done to the soft tissues and more uniform constriction of the part is obtained.

In amputation of fingers and of toes for injury, less pain is occasioned the patient if the primary injections are made through the wound, reserving the punctures through the skin until a later period, when the sensitiveness of this structure may be made use of in determining the degree of anæsthesia produced.

The quantity of cocaine required to produce anæsthesia varies with the operation and its extent; as a rule, for ordinary minor operations, from twenty-five to forty minims of a four per cent. solution are needed. The length of time necessary for the production of local insensibility under cocaine varies from three to ten minutes.

Individual susceptibility to the toxic influence of cocaine is a complication of sufficiently frequent occurrence to surround the use of the drug with due care and caution, but it is not a contraindication to the employment of the agent as an anæsthetic. Untoward effects may arise from the use of any one of the anæsthetic substances.

Another objection urged by some surgeons to the employment of cocaine for anæsthetic purposes is based on its asserted power of inducing the so-called "cocaine habit." As yet, this influence of the drug is extremely rare. It is most liable to occur among the patients who are informed of the nature of the remedy used, and especially is this the case when it is employed internally for medicinal purposes. I hardly believe that this action of cocaine can be produced when it is employed for its local anæsthetic effect and in the small quantity needed to induce local insensibility.

2. *In genito-urinary surgery*, cocaine is to be used with more than ordinary care, as it is in this class of cases that the untoward effects of the drug have been most frequently noted. It has been employed successfully to allay excessive irritability of the urethra before the passage of sounds or of bougies: it is important, in such instances, not to allow the solution to remain in contact with the mucous surface more than a few moments, and to subsequently encourage the outflow of any excess.

In the operation for circumcision, the anæsthetic action of the drug is prompt and efficacious, but it is important to remember that the circulation must be controlled before the injections are made, and that after the foreskin is removed and the sutures inserted, but not tied, that the ligature employed to regulate the blood-supply is removed and free bleeding allowed, that as much of the drug as possible may be washed out of the system.

For the purpose of preventing the pain incident to the removal of venereal warts, or in the cauterization of venereal sores, the drug is satisfactory.

For the production of anæsthesia, previous to the operation of internal urethrotomy, opinions differ as to its efficacy and to the danger involved of producing the toxic effects of the drug. The weight of evidence seems to prove that cocaine is not to be employed indiscriminately in these cases, and when used should be administered with caution and with a knowledge of the possible risks involved. That it is possible to avoid any untoward effects from its use in the operation is shown by the testimony of Dr. John B. Deaver, who has employed co-

caine in a large number of operations requiring internal urethrotomy without experiencing the slightest ill-effect to the patient.

3. *In gynæcological practice*, the drug has a limited field of usefulness. As a rule, in operative procedures classed under this head, general anæsthesia is to be preferred, as the patient's knowledge of the exposure of her person is often quite sufficient to unnerve her for the operation, and may even be the means of frustrating the surgeon's work.

For slight operations and those easy of performance, such as the extirpation of vascular vegetations at the mouth of the meatus urinarius, the removal of stitches from the vagina, etc., anæsthesia from cocaine is all sufficient. For the vaginal examination of highly nervous and hyperæsthetic women, cocaine, applied to the orifice of the canal, will render comparatively easy an otherwise difficult operation. For the primary repair of the perineum, when an anæsthetic is indicated, a dossil of cotton saturated with a solution of the drug and placed in the wound will accomplish the desired purpose.

4. *For ophthalmological work*, the surgeon finds in cocaine the anæsthetic *par excellence*. In no other department of surgery do we find its use so widespread and its application so entirely satisfactory. While this is true, it must be remembered that to obtain the best results it is more essential here than elsewhere to employ a perfectly pure drug in a freshly-prepared solution. Many of the untoward effects ascribed to the use of cocaine in eye surgery are due undoubtedly to the neglect of these two essential points.

All of the operations upon the eyeball may be performed under cocaine anæsthesia, except iridectomy for acute glaucoma (see reply of Dr. L. Webster Fox, Letter No. 13) and enucleation. Even in the latter instance, according to Dr. Albert G. Heyl, where the patient does not come under the influence of the general anæsthetic, or when it is desirable to shorten the duration of the operation, the instillation of a solution of cocaine enables one to begin it earlier than would otherwise be possible; he, therefore, sees no reason why the drug should not always be used in the operation with this object in view.

Owing to the effect of the drug on the cornea in producing drying of the epithelium, it is essential not to use it too long a period before an operation, and, when it is instilled, that the lids be kept closed until the moment of beginning the same.

5. *In operations upon the ear, nose, and throat*, cocaine is of great value as a local anæsthetic. It is also of use as a means to render diagnosis of the condition of these parts easier and more certain.

In aural work, according to the testimony of Dr. B. Alex. Randall (see Letter No. 37). Brucine excels cocaine as an anæsthetic, and morphine and atropine as analgesics. In nasal cases the drug is of extreme value both in the study and the treatment of abnormal conditions. Dr. J. Solis-Cohen and Dr. Carl Seiler both speak in the highest terms of its use as an anæsthetic in operative procedures upon the nasal chambers.

For the purpose of rendering the exploration of the larynx easy, the excision or scarification of the tonsils painless, and to permit the painless removal of pharyngeal neoplasms, elongated uvulæ, etc., cocaine is the anæsthetic indicated.

In concluding this paper, I would express my obligation to the gentlemen, whose letters are herein incorporated, for their courteous replies to my communications of inquiry regarding their experience with cocaine in minor surgery. To them belongs the credit of any value which this article may possess as a contribution to the clinical study of cocaine as a local anæsthetic.

1610 Arch Street.

CREOLIN IN DYSENTERY, SEROUS DIARRHŒA, AND SUMMER COMPLAINT.

By Edward W. Watson, M.D., Philadelphia, Pa.

BELIEVING that many unrecorded bits of experience would be of use to the practitioner if published, I wish to call attention to the value of creolin as used by enema in dysentery and allied conditions.

The spring of 1890 in Philadelphia was marked by a considerable prevalence of acute dysentery of a typhoid character in scattered localities. It occurred to the writer while searching for a safe and efficient antiseptic to use creolin. It evidently occurred to others in the same way, for, after using it for some time successfully, I noticed in a current journal a quotation from a Russian source, wherein its use was advocated for the same complaint. In regard to personal experience, the small epidemic enabled me to employ it during the month of June, 1890, on twenty-three cases. These were of all grades. Some at the beginning, others almost exhausted; but in all but one the use of a large enema, containing one-half of one per cent. of creolin,—one drachm to a pint,—was followed by

results quite surprising. One of the worst cases, a girl of 12, in the fourth day had had between thirty and forty stools, bloody, shreddy, and fetid, and, after an enema at 7 P.M., did not require the pan, had no stool or attempt, slept quietly all night, and had a formed movement in the morning. This, as in all the cases, without any other medication. Another, a boy of ten, seemed moribund, but after an enema, the number of mucus stools, which had been in the previous twelve hours thirty-five or forty, was reduced to one, and after a subsequent enema normal passages occurred. This child's two brothers were attacked during my second visit with violent symptoms. An enema was administered to each, and no subsequent sign of the disease occurred at all. In short, all the cases recovered, in whatever stage they were, from the commencement of the treatment. Contrasting this with the usual course of dysentery, and its exasperating uncertainty, even with the saline treatment, one can claim that so far creolin is without an equal. The one exception puzzled me for some time, until I discovered that the mother, ignorant of how to use an enema, had simply omitted it, and lied.

But from this use of the creolin to another was but a step. As the season advanced numerous cases of "summer complaint"—colitis and entero-colitis—occurred as usual, and it occurred to the writer to try the same method. These were infants, and the amount of creolin was reduced to one-half drachm to a pint of warm water, and twice a day the bowels were flushed with a gravity syringe. Here the result was also everything that could be expected. Bearing in mind that it was not employed in the cases of *sudden* onset, bounding and rapid diarrhœa, which are called cholera infantum, but in the more frequent, equally dangerous, but more protracted cases, where diarrhœa sets in, keeps up, and gradually wears out the infant, with recurring exacerbations, till finally often the so-called cholera infantum extends with such violence as to destroy what little resistance and life remain. In short, wherever there was diarrhœa, with green and bloody or mucus stools, undigested curds, etc., the remedy, when faithfully used, rapidly restored the natural character and frequency to the evacuation, and the immense improvement to the child showed that besides remedying the catarrhal process, there must be also something to be credited to the washing out of deleterious secretions.

Having little or no dysentery to treat up to this date, in 1891, I have been employing the remedy in these cases this year with the same success. I would also note that during the winter occasionally in young infants I met with cases of sudden and rapidly-exhausting serous diarrhœa. All of these, which were treated in this way, three in all, were so treated after the usual medication had failed and with rapid success, and I think that there is enough in it to warrant calling attention to it and the giving it a further trial.

131 NORTH TWENTIETH STREET.

THE VALUE OF CHLORALAMID AS A CALMATIVE IN THE FINAL STAGES OF HEART-DISEASE.

BY J. A. PATTERSON, M.D., SALEM, N. J.

CHLORALAMID being one of the newer remedies, I feel that the report of cases bearing upon its action in detail would be of value to the profession. It appears to me that we are apt too frequently to look only at the more decided and outspoken action of remedies, thus failing to note their smaller and more remote characteristics, the latter characteristics ofttimes becoming of the greatest value in prescribing. I therefore beg to offer the following notes:

Mrs. M., aged 60, had been a sufferer from heart-disease for the past eight years. When she first consulted me, two and one-half years ago, dyspnœa, cough, and consequent inability to sleep caused her the greatest suffering. Aortic stenosis was found existing at that time. One year ago she was ailing all winter, but the warm weather of early summer aided her convalescence. The advent of cold weather last fall again increased her suffering. Dropsy, which had heretofore been very slight, being only noticeable at the ankles, now gradually increased, and the urine became albuminous. The disease slowly progressed towards its fatal issue. I had been gradually forced by her suffering to increase the quantity of morphine, which I had first started in small doses hypodermically, until it became ineffectual, except in such large doses that I feared it might prove disastrous. My thoughts now turned to chloralamid, which I had used as a mere hypnotic, but had not tried in such extreme cases. I had given it in only one case of heart-disease, that being a mild case of aortic disease, characterized by insomnia and debility, no failure to any extent in compensation having occurred. At that time I could find nothing in

literature that would give me information as to its freedom from danger in such cases. I therefore began its administration cautiously. My patient at this time could not lie down. She would occasionally get one to three hours' sleep under a large dose of morphine hypodermically. Chloralamid was begun in 10-grain doses, at first using a smaller injection of morphine, until 40-grain doses were administered. The morphine was gradually lessened, and finally its administration ceased. The patient obtained *better* and *longer* rest and sleep in a recumbent position than when morphine alone was being administered. I watched its effects closely, and was gratified to find the pulse not made worse, but rather improved.

The case terminated fatally, but the relief obtained by promoting slumber in a recumbent posture by means entirely within the bounds of safety makes the remedy of great value in this class of cases.

PERMANGANATE OF POTASSIUM AS A URINARY TEST.

At the meeting of the Hunterian Society, held February 25, 1891, MR. F. R. HUMPHRIES read a paper on the reduction of permanganate of potassium by the urine, in which he stated (*British Medical Journal*, March 14, 1891) that, after testing the known organic and inorganic constituents normally present, he came to the conclusion that a phenol was the only one which could produce this effect. The phenol might be present in such a form as to admit of ready oxidation. Baumann had proved that phenol, besides being made in the intestine, was also formed during the decomposition of albumen. The reducing body corresponded in its diurnal variations with urea and the uncombined sulphates; it was, therefore, certain that it was, like them, a product of the metabolism of the tissues. If the reducing body was a phenol compound, it ought, when retained, to produce cerebral and nerve effects. It was remarkable that the forms, degrees, and symptoms of carbolic acid poisoning bore the very closest resemblance to those of uræmia, and that several of the most useful drugs in the latter condition were antidotes in the former. It was found that when the excretion of the reducing body was much diminished or increased, symptoms of uræmia were generally present. One cubic centimetre of a five per cent. solution of permanganate was diluted with 4 or 5 parts of water in a test-tube, and the urine rapidly run in from a pipette marked in cubic centimetres. The normal amount of the reducing body excreted in the twenty-four hours was found to be from seventeen to thirty-four grains, reckoned as permanganate, being highest in the first urine of the morning, in that passed four or five hours after a meal, and in fine warm weather. It was much increased in all febrile cases, except when marked cerebral symptoms were present; much diminished during a sick headache, but increasing rapidly as it passed off. The author claimed to have discovered the presence of a powerful reducing body in the urine, whose daily history showed it to be a product of the metabolism of the tissues, whose reactions corresponded to a certain extent with those of a phenol, and whose suppression or excess corresponded closely with febrile cerebral symptoms, and with those of uræmia.

DR. W. HUNTER said the views of Proust and Thudichum on urine pigments were foremost down to 1870; since then Jaffé had opened a new era. The coloring-matter was no longer looked on as an independent body, but as a variety of pigments whose genetic relation to those of the bile and blood was established. Bilirubin was, without doubt, of the same nature as hæmatoidin; the relation was illustrated in old blood extravasations where blood was found in the centre; then an area of hæmatoidin crystals, and outside the green color of biliverdin. The modifications of urobilin found in urine (MacMunn) were almost precisely the same as those found in the bile. Urinary pigments were extremely unstable, and readily passed from one body to another when exposed to the air to a few drops of acid. He viewed, then, with suspicion the results of such heroic methods as the use of phosphomolybdic acid, and relied more on the spectroscope and simple extraction with ether, etc. These methods led to the belief that all the pigment was derived from the blood, and was hence an index of changes in the body.

DR. LEWIS JONES had found a red body in febrile urine, giving a band at F, the junction of green and blue; this was urobilin, the uropittin, he supposed, of Dr. Thudichum. The color of normal urine was due to a yellow body, which gave no characteristic spectrum, and was unknown.

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Leading Articles.

THE PROPHYLAXIS OF DIPHTHERIA.

ONE of the results of recent bacteriological researches is the tenacity of life which the Klebs-Lœffler bacillus presents. Roux and Yersin have kept for six months a culture in broth in a tube tightly sealed; this, when sown anew, gave strong colonies, and proved to be very virulent in the guinea-pig and hare. Clinical experience has confirmed the experience of the laboratory.

In diphtheria the substratum of the contagion is solid; the virus resides in the false membrane. If the liquids of the mouth are vehicles of the poison, it is through the fragments of false membrane which they contain. This contagion, deposited on cradles, furniture, the walls of the room, tapestry, has been known to be active after months and even years. Cadet de Gassicourt gives instances where the disease was contracted in a virulent form by sojourn in a room where months before a child had died of diphtheria. Darolles gives a "history of a cradle," which is instructive in this respect. In the course of an epidemic in the country, an infant died in a wicker-cradle of diphtheria. Darolles urged the parents to destroy the cradle, but they refused. Eighteen months afterwards another infant contracted diphtheria in the same place at a time when the disease was unknown in the village and died. Two years afterwards, a third infant contracted diphtheria in the same cradle and got well. The parents consented to destroy the cradle, and there were no more cases of diphtheria in that family.

Sevestre, in his "Études de Clinique Infantile," gives examples of the same sort. The contagion is exceedingly prone to cling to clothing, and the disease has in many instances been traced to this source. In one case, a scarf worn around the neck of a child that had died of diphtheria seems to have been the means of communicating the infection to a sister of the deceased.

Fortunately, the contagion is of a heavy nature, and is but little diffusible; the disease may attack a family and spare the neighboring families, and thorough disinfection seems markedly to limit its spread.

There is some evidence that the disease has been communicated by fowls sick with a kindred affection, and that it has been conveyed in milk sold from dairies attached to houses where there are cases of diphtheria.

In the prophylaxis of this disease, the first requisite is thorough isolation of the patient. The same isolation should, as far as possible, be made to extend to other members of the family. Physicians attending the sick child should scrupulously disinfect their persons and their clothing. All clothing that has been worn by the patient should be subjected to prolonged boiling, or to a dry heat of 240° F., before being again used. Thorough antisepsis of the sick-room should be practised, by sublimate washings and by burning sulphur. Children that have become convalescent should be disinfected by baths of weak sublimate water.

There should be suppression of suspected milk, and an inquiry into all other possible sources of contagion, with a view to removing them.

Maurice Nicolle makes a good hint in reference to physicians attending diphtheritic patients; they should put on a blouse before entering the sick-room, and remove it on leaving.

Dr. William H. Welch commends the prophylactic value, in persons liable to exposure to diphtheria, of cleanliness of the teeth and mouth, and of the frequent use of weak anti-

septic mouth-washes, nasal douches, and gargles. Lœffler recommends for this purpose aromatic waters, weak sublimate solutions (1 to 10,000), chlorine-water (1 to 1000), and thymol (1 to 500 parts of twenty per cent. alcohol).

RHUS-POISONING AND ITS TREATMENT.

THE symptoms and behavior of so-called rhus-poisoning should at the present day be sufficiently well understood to render remarks bearing thereon unnecessary; but the many vaunted and specific cures persistently brought forward year after year, as almost of lightning rapidity in their effect, would seem to indicate that some enlightenment or reiteration is still called for on these points. It is, first of all, not to be lost sight of that the inflammatory action is of artificial origin, that it is produced by an accidental, short-acting external irritant, and is not in any sense an idiopathic inflammation, such as eczema and similar diseases. Moreover, individuals differ as regards susceptibility, probably the majority being invulnerable to the poison, others but slightly susceptible; while in others, again, the action excited is extremely violent in character. The length of exposure, the dose of the poison, as it were, may also have a bearing upon the degree of inflammation. These factors, carefully considered, prove, as those of wide experience in the treatment of this condition know, that rhus-poisoning may be either mildly erythematous, erysipelatous, vesicular, pustular, or bullous. All of these types will disappear spontaneously, some, owing to the degree of inflammation, taking longer for repair than others. The type has, therefore, much to do with the duration of the attack. There is another point, however, which is sometimes overlooked, and that is that the skin of various individuals differs in reparative energy, thus explaining, irrespective of treatment, that the same type of the affection in different individuals may differ considerably in duration. Were these various facts properly appreciated, there would not be so many so-called specific remedial applications for the treatment of this affection advanced from time to time. In other words, the cures resulting as a part and in consequence of the natural course and behavior of this dermatic inflammation, are often erroneously ascribed to the special treatment employed. In this connection, to make this more emphatic, reference may be made to the vaunted brilliant cures effected (?) by the homœopaths by the internal administration of infinitesimal doses of the rhus plant itself. Briefly recapitulating, we have an artificial inflammation that may be mild or severe, always drifting towards cure, its duration, which may be but a few hours or several weeks, depending mainly upon the type and partly upon the individual. Exceptional individuals there are, it is true, in whom this irritation grafted upon a naturally eczematous skin, results in a stubborn and persistent eczema, but any external irritation in such cases would in all probability have the same effect, and such instances have in reality no bearing upon the subject in hand.

We do not mean to urge that the treatment of rhus-poisoning has no influence upon the course or duration of the disease; for, on the contrary, it always has the same as appropriate measures would have in any other artificial cutaneous inflammation; but it has no more and no less than this. There is, in brief, no one or several cut-short remedies, but there are appropriate and inappropriate applications, just as in the treatment of other inflammatory dermatoses. With the nature, behavior, and self-limited character of the condition recognized, the choice of proper remedial measures is not a difficult one. They consist of protective, soothing, astringent, and antipruritic applications. There are numbers of such remedies, as literature will show, which may be used successfully, safely, and with comfort to the patient. For the erythematous type, with or without erysipelatous swelling, lotions and dusting powders are the most grateful. Among the former may be mentioned carbolic acid in the strength of one or two drachms to the pint of water, to which may be added one to three drachms of alcohol and one-half to one drachm of glycerin; boric-acid wash, fifteen grains to the ounce, with or without a minute quantity of glycerin, and, if the itching or burning requires it, a small quantity of carbolic acid; boro-phenol, five or ten grains to the ounce; ichthyol, one to five grains to the ounce; zinc sulphate, one-half to one drachm to the pint; and fluid extract of grindelia robusta, two to six drachms to the pint. The wash employed may often be advantageously followed by a dusting powder, such as rice flour, starch, boric acid, or talc, or a mixture of these; or, in some of the extremely mild cases, the powder used alone forms a clean and comfortable method of treatment. For the mod-

erately severe type, with vesiculation, the same remedies and plans as outlined above may be likewise employed, and found all that is required; or, what is probably more satisfactory in these cases, the wash used may be supplemented with an ointment, such as the oxide of zinc ointment, calamine ointment, cold cream, or petrolatum. Especially valuable is the combined treatment by lotio nigra and the oxide of zinc ointment. In this type also, in some instances greater effect seems to follow the application of an ointment alone. In the severe—pustular and bullous—types of the inflammation, the methods above mentioned may also be used as stated or with some modifications. If a wash is used alone, it should be applied by means of wrapping of linen or soft cotton, the parts being kept thus constantly and thoroughly wet. Ointments, if employed, must be thickly applied, spread upon patent lint or similar material, a small quantity of carbolic acid, thymol, or resorcin added to control the burning or itching present.

THE RADICAL CURE OF HERNIA.

THE victims of hernia in every community are numerous, and may suffer all their lives from their infirmity. Those are fortunate who, by wearing a light spring truss, obtain exemption from the more serious inconveniences; there are others to whom the presence of the truss is a perpetual annoyance and discomfort. There are many stubborn cases that can be but imperfectly remedied by any retentive apparatus, and such persons are always menaced by strangulation.

Among the afflictions which fall to the lot of the country physician is the care of difficult hernia cases. He will be continually consulted by patients whom experts have failed to fit with a suitable truss, and he will be put to his wit's end to relieve such patients. This is especially true in reference to herniæ in infants.

It cannot be denied that the stand-point of the surgeon of the present day, in respect to the treatment of hernia, is different from the stand-point of half a century ago. Before the days of antisepsis, he approached a necessitated herniotomy with fear and trembling. He had virtually to perform an abdominal section involving the peritoneum, and the danger attending peritoneal wounds was vividly present to his mind. It was only after thorough taxis, aided often by ice applications and tobacco enemata, that he would venture on a cutting operation, and then too often, when the sac was dissected out and opened, gangrene was found to have invaded the sac and intestine, a gangrene caused by long continuance of the strangulation and the violent measures used to reduce the hernia.

If, in a former day, there was such reluctance on the part of surgeons to do a herniotomy, there is much less cause for timorousness and delay at the present day, when the operation, if done antiseptically, is so safe; and it is a well-understood tenet of modern surgery that, in a case of strangulated hernia, when, after the administration of an anæsthetic, a certain amount of taxis, not too prolonged or too energetic, but performed with care and skill (*arte, non vi*), has failed, the surgeon should immediately resort to the knife. The steps of the operation have not materially changed of late years, only it is done as antiseptically as possible; there is now a general consensus among surgeons that the sac should be opened and the intestine examined before being returned to the abdomen; it is also customary, as it was among good operators fifty years ago, to excise redundant portions of the sac after proper ligation to prevent hemorrhage. If nothing more is done except proper closure of the wounds and the application of antiseptic dressings, the operation is often attended with cure of the hernia; effusion of lymph follows, and the formation of cicatricial tissue, which may be sufficient to close the hernial openings and prevent any future descent of the bowel. At any rate, the hernia, if it returns, is generally more easily managed after the operation.

Should the surgeon go further than this? Should he complete the herniotomy by certain procedures intended to constitute *the radical cure?* Ought patients who are great sufferers from herniæ, which are with difficulty, painfully, or incompletely kept reduced, to submit to the "radical cure," even though strangulation has never happened? In answer to this question, it should be borne in mind that the mortality from hernia operations under antisepsis is very small; good operators, as MacEwen, Marcy, Halstead, McBurney, Gerster, Gibney, Senn, Warren, Keen, tabulate almost uniform success. Great numbers of bad cases have been completely cured, and after months and even years of exemption from their old infirmity, affirm most emphatically that the gain has been

worth all the risk. Considering, then, the little risk of death and the reasonable prospect of success, it would seem that this operation is justifiable wherever a person long afflicted, and more or less disabled by a bad rupture, desires to be cured. With regard to the first question, if, as good authorities now teach, the gravity of a herniotomy is not enhanced by making a few sutures designed to close the rings and the canal, and if the radical cure operation gives the patient a better chance to get rid of this hernia, the surgeon should not neglect any of these precautions.

It is our purpose in the present article to treat only of that most common form of rupture known as inguinal hernia (though the general principles are applicable to femoral and umbilical), and to omit all mention of obsolete modes of treatment, like those of Wützer and John Wood. Nor shall we touch upon the injection method, by which operators have sought to obliterate the hernial canal by exciting adhesive inflammation and exudation, various irritants being used for this purpose, as tincture of iodine or cantharides, a solution of oak bark, etc. This method, which has had considerable repute through Dr. Heaton and Dr. J. H. Warren, of Boston, is virtually but little employed at the present day.

An operation which has won much favor, and seems to be commended by its results, is thus described by Küster in the *Centralblatt für Chirurgie*, March 17, 1889. It consists in opening the sac in the usual way, restoring the bowel to the abdominal cavity, cutting off the sac, and stitching the edges carefully. After this the hernial opening is stitched (care being taken not to strangulate the cord), and the rest of the wound closed by successive rows of continuous catgut suture, so that there is no space left for any accumulation of blood or serum between the cut surfaces. After the skin is sutured, the wound is painted with iodoform collodion until no blood can come through the coating. After this no further dressing is applied.* Dr. Henry O. Marcy, who claims priority in the use of catgut or tendon sutures in this operation, having operated very much in the manner above described as far back as 1870,† has added an important modification in the use of the buried suture, by which the wound is finally hermetically closed. "The basic and fundamental factor," says Marcy, "consists in closing the divided and weakened structures by strong sewing with a carefully-prepared animal suture after removal of the sac. This is aseptically applied, and approximates the refreshened tissues by layers of buried suturing, so as to avoid the necessity of drainage, and thus allows complete closure of the wound hermetically sealed with iodoform collodion, a very simple but germ-proof dressing." The buried suture is best effected by the use of a slightly-curved Hagerdorn needle carried from within, through the deeper layer of the skin, from side to side. This evenly coapts the edges of the skin, without the vestige of a stitch in sight. The operation is conducted throughout under irrigation, a 1 to 2000 sublimate solution being used.

The uselessness of drainage is emphasized. Coapted surfaces, held aseptically at rest, readily tolerate the limited effusion which is utilized in the processes of local repair.

Marcy claims eminently favorable results for this operation. It is comparatively safe. He has never had a death. Out of seven hundred and seventy-nine cases which he has collated, there were but five deaths, and these are explained as having resulted from conditions not referable to the operation. As to its success, of cases which he has investigated, "fully ninety per cent. have been permanently cured."

One part of his operation on which he much insists is the reforming of the inguinal canal. "In large direct inguinal hernia, it is important to restore the obliquity of the canal, nature's wise provision for maintaining the closure of the canal by intra-abdominal pressure in health. This is effected by commencing at the lower and inner border of the ring, the cord having been gently laid to one side, and closing by double suturing quite to the inner opening of the ring upon the cord, which is now replaced, and the external pillars of the ring are closed by a similar suture downward and inward to the pubic tubercle."

Other surgical authorities (as Agnew, *Univ. Med. Mag.*, April, 1890) do not have so much faith in the suturing of fascia, and counsel repression of operative ardor till wider and longer experience has been attained. McBurney looks upon the suturing of the canal as of questionable utility. "No really fresh or raw surfaces are brought together, and as the overlying tissues are afterwards sewed and the whole wound covered with an antiseptic dressing, these sutures are purely sub-

* Quoted from "Sajous's Annual," 1879.

† "A Treatise on Hernia: the Radical Cure by the Use of the Buried Animal Suture," 1889, G. S. Davis; also *Journ. Amer. Med. Association*, November 2, 1889.

cutaneous ones and useless." It is, doubtless, more the exudation which follows the operation, and the subsequent cicatricial tissue-organization, closing the inner ring and narrowing the canal, that are really effective, than the bringing together of the edges of the ring and pillars.

The only certain measure, according to MacBurney, for obtaining complete closure of the whole inguinal canal, except the portion occupied by the cord, is by the open treatment.

As this operation has not been before described in the GAZETTE, we will devote some little space to the principal details of the operation, at the risk of making this article unduly long.

"To insure firm and dense cicatricial tissue throughout the length and depth of the canal, one must carefully pack by some dressing down to the transversalis fascia in the lower, and to the peritoneum in the upper, part of the canal.

"Before operating, most careful antiseptic precautions are taken, especially in cleansing surrounding parts. The incision begins a little outside the inguinal ring, and extends sufficiently downward over the sac. This is rapidly deepened over the whole length of the canal, thus freely exposing the aponeurosis of the external oblique muscle. The superficial layers of the sac are now cleared away, and the two pillars are completely exposed the entire length. The sac is still covered below the external ring by fascia, which is now opened. The scissors are pushed under, and the canal is split a little beyond the outer edge of the internal ring. The deeper coverings of the sac are now dissected off, this being best and most rapidly accomplished with the fingers. If now the transversalis is removed high up in the canal, it is quite easy to separate the cord from the sac. The cord now being separated from the sac a little within the abdomen, the whole sac is dissected out and lifted up. In some cases, as in congenital hernia, the sac must be cut away from the cord. The sac is now opened, and if intestinal contents are present they are reduced; if omentum, it is ligated, and cut away. Adhesions are broken down if any are exposed. The sac being now held up from the internal ring, the operator inserts one or two fingers through the neck a little way into the peritoneal cavity, to guard positively against return of a piece of omentum or intestine into the sac during the placing of the ligature. The ligature is placed about the neck of the sac at the highest point, the level of the peritoneum, drawn very tightly, and the part cut away. There is then a wound, the upper wall of which is formed by the edges of the skin, superficial fascia, external oblique aponeurosis, and conjoined tendon, while the lower wall is formed by skin, superficial fascia, and a strip of aponeurosis or Poupart's ligament, including the outer pillar. The aim being to secure granulation to the bottom, it is not sufficient simply to pack the wound. Stitches are inserted, from four to eight in number, according to the size of the wound, to bind together the tissues which form the upper wall, and two or more tension sutures carried across the wound. The wound is now carefully irrigated, and dusted with iodoform throughout, and iodoform gauze is firmly packed the entire length down to the posterior wall. The scrotal or labial wound is sewed up, without packing. Proper dressing is applied to prevent soiling of the wound. The dressing is changed once in four or five days. A clear scar forms in from five to six weeks, and is very strong. The patient is not afterwards allowed to wear a truss or support of any kind, as pressure by a truss is regarded as injurious to scar tissue.

"Dr. McBurney has done the operation thirty-six times in inguinal hernia. One patient, an old drunkard, died in delirium tremens. In only one has there been a relapse of the hernia, and that can be easily accounted for by a defective operation. The first operation was done only two years ago, consequently the time may not be long enough to convince some that the cure is permanent.

"The paper was discussed by Drs. L. A. Stimson, A. G. Gerster, Abbe, McCosh, Hartley, Syms, Gibney, and Murray, most of whom had performed the operation and preferred it to any other."*

ETHYLENE BROMIDE—A NEW REMEDY IN THE TREATMENT OF EPILEPSY.

DR. J. DONATH recommends ethylene bromide as a substitute for potassium bromide in the treatment of epilepsy (*Pharmaceutische Post*, June 14, 1891). The long-continued use of bromide of potassium entails a series of unpleasant after-effects, which

* Report of meeting of New York Academy of Medicine (*Medical and Surgical Reporter*, March 9, 1889).

are manifested in disturbed action of the skin, mucous membranes, and general nutritive processes, which are generally attributed to the action of the potassium; and Dr. Donath believes that in ethylene bromide he has found an organic combination in which the action of the bromine is accentuated and more readily and more powerfully exerted than in any bromine combination as yet known. He reports in detail in the *Therapeutische Monatshefte* for June, 1891, ten cases which have been under observation for several months, which show that the use of ethylene bromide so far reduces the convulsive attacks as to make them of more seldom occurrence and of such slight severity that even when they were not entirely prevented they were so reduced in intensity as to exist simply in the form of more or less slight muscular contractions without loss of consciousness.

Ethylene bromide occurs in the form of a light brownish-colored liquid, with an odor somewhat similar to that of chloroform, and a taste which is at first sweetish, and becomes afterwards burning. At the freezing-point it solidifies into a snow-white crystalline mass; it boils at 300° C. Its specific gravity is 2.163, and it contains 90.9 per cent. of bromine. This fluid is insoluble in water, but readily mixes with alcohol and oil, and may be readily administered in the form of an emulsion. Dr. Donath recommends its administration in milk, his favorite formula being

℞ Ethylene bromide,
Spirits of wine, āā ♏xxxii;
Oil of peppermint, ♏ii.

Of this, 5 to 15 drops may be administered two to three times daily, or it may be administered in gelatin capsules, in doses of 3 drops, mixed with six drops of oil of sweet almonds, of which, two to four may be taken two or three times daily, and, according to the author, it is likewise suited for subcutaneous administration in oily solutions. The dose may be increased progressively until 70 drops is reached, the dose for adults two or three times daily, or 10 to 20 drops for children. It should be remembered that a minim contains a little more than two drops of the ethylene bromide.

Before proceeding to the therapeutic use of this substance, Dr. Donath tested it on himself, and found that in ordinary therapeutic doses it produces no evident effects whatever in a healthy individual, and only in very large doses did it cause some nausea. Most of the cases of epilepsy in which he tested its therapeutic power were cases of long-standing, which had for years been under the influence of potassium bromide. Twenty-one such cases were treated, but only notes of ten are referred to in detail, as the others were under observation too short a time to attempt to form reliable conclusions.

This substance should not be confounded with the bromide of ethyl, the anæsthetic, which has the formula C_2H_5Br. Ethylene, or olefiant gas, has the formula C_2H_4, and originates when alcohol is heated with concentrated sulphuric acid. Ethylene unites with two atoms of bromine to form a chemical compound analogous to ethylene chloride ($C_2H_4Cl_2$), which, under the name of Dutch liquid, was for some time used as an anæsthetic.

Reports on Therapeutic Progress.

THE TREATMENT OF PHARYNGEAL DIPHTHERIA BY SUBMEMBRANOUS INJECTIONS.

At the meeting of the American Medical Association, Dr. A. Seibert, of New York, reported thirty-five cases of pharyngeal diphtheria treated by submembranous injections, with a demonstration of the methods employed (*Medical Record*, June 6, 1891). His instrument was virtually a hypodermic syringe, having a long nozzle terminating in a hollow plate. At right angles to the latter were several very short ordinary hypodermic needles not over one-eighth of an inch long. The long nozzle could be bent on its axis at various angles, so as to fit the different portions of the throat. His fluid was the aqua chlori of the United States Pharmacopœia. Pharyngeal diphtheria was at the start always a local process. The bacilli gained access to the deeper mucous layer alone, or with streptococci, causing the exudate. The false membrane was to be regarded as the result of this action rather than as the disease itself. The treatment should be local, so as to kill the bacilli early, before they became so deeply embedded as to become beyond the reach of our antiseptic fluids. Giving bichloride by the stomach was useless. To remove the membrane and rub in the same solution hurt the sound epithelium, and the bacilli were thereby only rubbed deeper into the tissues. Chlorine-water (from one-quarter to one-half a syringeful) was easily injected over the minute spots which were seen during the early stage of the disease. In only one case had the gag been required.

The chlorine was penetrating and attacked bacteria and all organic matter. It was better to inject deeply. It was believed that where the membrane was of a dirty, sloughing nature, there were more streptococci than bacilli present. The injections should be made on an empty stomach. The pain was slight. A mouth-wash was subsequently used of iodine and carbolic acid, and an ice-bag was placed over the neck. Food and stimulants were given as usual. While during the day the child might be disturbed frequently for the various procedures necessary, it should be allowed to remain undisturbed from midnight till 6 A.M. All of his cases were at least three days old. The membrane remained for from two to four days, but it came away mechanically under the influence of the mouth-wash. He had lost only two cases out of the thirty-five, one from heart-failure and tracheo-bronchial diphtheria which had come on before he saw the case, and the other had been improperly treated by the attendants. Cultures made in ten cases showed the Loeffler bacillus in each instance. Not one of the favorable cases had any subsequent paralysis, because the early germicidal action of the remedy prevented ptomaïne formation.

THE EMPLOYMENT OF THE LEAVES OF THE COMBRETUM RAIMBAULTII IN THE TREATMENT OF BILIOUS HÆMATURIC FEVERS.

In *Les Nouveaux Remèdes* for May 24, 1891, PROFESSOR HECKEL writes that he recently had sent to him leaves of a plant, which on the western coast of Africa enjoyed a great reputation among the aborigines as a remedy for hæmaturic bilious fever. Among the natives speaking the *Soso* tongue this plant is known under the name of *kinkélibah*, and is used by the natives in bilious fever, colic, and for the arrest of vomiting, employing a decoction of the leaves. Professor Heckel gives an account of some observations made by a medical missionary, named Raimbault, in which several cases are detailed where this substance was employed, from which the conclusion was drawn that the *kinkélibah* is an active tonic; that it is a diuretic; that it is at first an emetic and then tends to prevent emesis; that it sometimes produces marked bilious diarrhœa.

Professor Heckel subjected the leaves to chemical analysis, and found that the principal constituents were tannin in extremely large amount and nitrate of potassium; and although these leaves are supposed to possess cholagogue properties, no principle was detected which could justify this assumption. It is evident that the claimed tonic and diuretic properties are apparently justified by the presence of tannin and the nitrate of potassium, while its chemical composition gives no plausible explanation of its other alleged virtues.

THE ACTION OF THE VAPOR OF ETHEREAL OILS ON BACTERIA.

Nothwithstanding the researches of Schultz, Koch, Schill, Fischer, Riedlin, Chamberland, and Braddon, the action of ethereal oils in a state of vapor upon bacteria is by no means well known. As this is a subject which bids fair to have practical interest for the physician as well as for the bacteriologist, a somewhat elaborate research by DR. OMELCHENKO, which is published in the *Vrach*, is a welcome addition to our information. Its details must have been very carefully planned and carried out, for it gained the Pirogoff gold medal of the University of Kieff. The observations were made upon cultures of the bacilli of typhoid fever, phthisis, and the Siberian sore (anthrax) by passing over them with the help of the aspirator a slow but continuous stream of air saturated with the vapor of certain ethereal oils, and noting the time which each different vapor required to destroy the bacilli; the quantity of each oil used and the volume of air passed over each tube, as well as the amount of each vapor which the air was capable of holding, were also noted. It was found that if the air was not quite saturated, the effect was very markedly diminished. The bactericidal properties of the different oils were found to be greatest in oil of cinnamon, after which the others may be arranged with reference to their bactericidal power in the following descending order: Oleum fœniculi, oleum lavendulæ, oleum caryophyllorum, oleum thymi, oleum menthæ piperitæ, oleum anisi, oleum menthæ crispæ, oleum eucalypti globuli, oleum camphoræ japonicæ, oleum valerianæ, eucalyptol, French oil of turpentine. The oils of lemons and of roses had an exceedingly slight action. Bacteria in a dry state were much less easy to destroy than those which were in their natural state; a fresh condition of the sporules of the Siberian

sore, however, weakened the destructive effect of the vapor. It was found that the protoplasm of the various bacilli was affected in its chemical constitution in a constant manner for each kind of bacterium, losing its power of taking the stain. This change seemed to affect all parts of the organism equally. The death of the bacteria was shown both by this loss of capacity for taking the stain, and also by the tendency to assume a granular condition. Tables are given of the experiments, from which we see that oleum cinnamomi and oleum valerianæ took the same time to destroy the bacilli of typhoid fever,—viz., forty-five hours; but, inasmuch as each litre of air took up only .0005 gramme of the former, as against .0082 of the latter, the total quantity of cinnamon oil used being .0646 gramme, while 1.0429 grammes of the oil of valerian was required, it is evident that the former deserves the higher place in the scale of bactericidal substances. Experiments by previous writers made with emulsions of ethereal oils placed in contact with bacterial cultures have not generally shown that these possessed a high bactericidal capacity, and Dr. Omelchenko found that when he passed the air through emulsions instead of through the oils themselves the amount taken up was materially less than in the latter case, and so it would appear that the bactericidal capacity of any one of these substances depends largely upon its volatility.—*Lancet*, April 4, 1891.

ON THE MODE OF ELIMINATION OF IRON SALTS.

With most ferruginous preparations, administered by the mouth, the greater part of the iron can be found in the fæcal matters, and the question at once suggests itself, Is this a sufficient reason for concluding that the iron has not been absorbed. Evidently not. But to make this conclusion legitimate, it must first be demonstrated that the iron is not eliminated by the intestinal mucous membrane after having been absorbed from the gastro-intestinal canal. This demonstration has been accomplished by Dr. Jacobi (*Gazette Médicale de Paris*, May 23, 1891). He has proved that, after the injection of the salt of iron, after a few hours only a small part (about ten per cent.) is eliminated with the urine, the intestinal secretions, and the bile, while the major portion—about fifty per cent.—is deposited within two or three hours in the liver, in the spleen, kidneys, and intestinal wall. In these experiments Dr. Jacobi employed the neutral double tartrate of iron.

RESECTION OF THE LUNG.

According to the Paris correspondent of *The Medical Press and Circular*, June, 1891, M. Tuffier presented at the last meeting of the Société de Chirurgie, a patient on whom he practised in March last excision of the summit of the right lung for localized tuberculosis, and gave the details of the operation. Before attempting the extirpation of the parenchyma of the lung, M. Tuffier made several experiments in the amphitheatre on ligature of that part of the organ. Through a small intercostal incision he tried to separate the pleural covering from the lung and get a ligature around it, but although he found it easy enough to detach the pleura above, in front, and behind, it was not so on the inside, and as the thoracic duct and the phrenic nerve are intimately attached at that point to the pleural layer, he was afraid of including them in the ligature, and consequently abandoned all attempt in this direction, and decided on performing resection of the diseased parts. And this decision gave rise to a series of questions to which he could not find a satisfactory answer at the moment. How would the lung-tissue bear a ligature? What are the mode and rapidity of reparation of the loss of substance? What should be feared from the innumerable vessels of the organ? How would the void left in the thoracic cavity be filled? In order to fix himself on these important points he resected the summits of the lungs of several dogs, and the result of his experiments was that the wound rapidly healed, and that the void was quickly filled by expansion of the parenchyma, provided the part resected was not too considerable.

His first patient was a man on whom in November last he performed the radical cure for hernia of spontaneous origin. The tumor occupied the sacral intercostal space. When he had made the incision he detached the pleura with his finger, and pushed it up to the summit, and explored the region, as the man's appearance was such that tuberculosis was suspected. The lung felt velvety to the touch, and if any induration had been present it would have been easily detected. The wound was then closed, and in a week the patient was cured of his hernia, and experienced no inconvenience from the exploration.

In a second patient resection was really practised. The man was 25, of stout build, and enjoyed perfect health until two months ago, when he was attacked with cough, night-sweats, and tuberculous laryngitis, and for which he entered the hospital. Auscultation revealed the following symptoms: At the top of the right lung dulness, respiration rude and jerky, expiration prolonged, and dry crepitation in coughing; the left lung was perfectly healthy, and the patient, being made aware of his condition, accepted the risks and perils of operative interference, especially as medical treatment but little changed his condition. The *modus operandi* was as follows: A cushion being placed under the back so as to efface as much as possible the subclavicular fossa, an incision was made through the second intercostal space to within half an inch of the sternum, the great pectoral and the intercostal muscles were similarly incised, and the pleura brought to view, which being cut in turn the tissue of the lung appeared. The operator then passed in his finger and detached the serous membrane above and without with comparative ease, but when he reached the inside the membrane yielded, and immediately a hissing sound occurred, indicating an escape of air or the formation of a pneumothorax. The finger was applied to the spot, and subsequently a plug of iodoform gauze. Continuing the operation, M. Tuffier passed his finger behind the summit of the lung, and, seizing the tissue with a special flat forceps, drew it forward, threw a ligature around it, and fixed the pedicle to the periosteum on the internal side of the second rib. The muscles were then sutured, and the wound dressed with iodoform. The piece resected was examined, and in its centre was discovered an induration of about the size of a small walnut, and surrounded with tubercles, in which bacilli existed. The man made a rapid recovery, and a minute auscultation of the lung showed that the respiratory murmur, although a little weakened, was present throughout the whole organ without revealing the slightest sign of a pleural effusion.

THE ALKALOID OBTAINED FROM THE TUBERCLE BACILLUS.

Great interest is naturally attached to the various experiments which have been made in regard to the pathological chemistry of the tubercle bacillus. Although we are now in possession of a pretty full knowledge of the mode of action of the products of the tubercle bacilli as exhibited by the recent experiments made in all parts of the world with tuberculin, we as yet know comparatively little of the chemistry of this substance. An alkaloid was obtained from the products of the anthrax bacilli by Dr. Sidney Martin, and PROFESSOR ZUELZER has succeeded in obtaining a similar body from the bacillus of tuberculosis. A short account of Zuelzer's mode of isolating the alkaloid is given in the *Wiener Medicinische Wochenschrift*, No. 10, 1891. The entire contents of the tubes in which the pure cultures were made were repeatedly treated with hot water acidulated with hydrochloric acid. The solution was filtered, evaporated, and then several times precipitated with platinum chloride; the double salt decomposed by sulphuretted hydrogen, and the liquid again filtered and evaporated to dryness. In this way an almost white crystalline salt was obtained, which was easily soluble in hot water, but with great difficulty in cold. Its solution was light yellow in color. After keeping for some time, the dry salt assumed a light-brown color. The chloride when injected into rabbits and guinea-pigs exhibited a characteristic toxic action; about one centigramme injected subcutaneously produced after from three to five minutes an increase in the frequency of respiration, the movements reaching 180 per minute. This continued for about a quarter of an hour, when the rate gradually became slower. The temperature rose in two out of the ten observations from normal to 100.2° F. Another constant symptom was well-marked protrusion of the eyes, which also appeared bright and shining, with somewhat dilated pupils. The sclerotic was considerably injected. It was remarkable that the protrusion of the eye was more marked on the side on which the injection had been made than on the other. All these appearances disappeared in from fifteen to twenty minutes. Toxic symptoms only showed themselves in three rabbits, and these had received somewhat larger doses, between 2 and 3 centigrammes having been administered. Death usually occurred somewhere between the second and fourth days. At the site of injections there was considerable redness, and small hemorrhages were found in the muscles immediately beneath. Small effusions of blood were also found in the mucous membrane of the stomach and small intestine. In two cases effusion occurred into the abdominal cavity. The brain was, as a rule, soft and congested. Almost precisely

similar results followed the injection of the alkaloid into the conjunctiva.—*Lancet*, April 11, 1891.

THE ADVANTAGE OF COMBINING IODINE WITH GLUCOSE.

The remedial value of iodine is well known. But it is also a fact that full doses cannot be administered internally except in the form of iodide of potassium. As a rule, in the various forms of disease to which free iodine is applicable any combination having an alkaline base is not desirable. In order to secure the specific action of a remedy adapted to relieve chronic disorders, and it is to this class of diseases that iodine is chiefly applicable, it is important that it should be to a certain extent cumulative and retained in the circulating blood for a sufficient length of time to exert its specific action upon diseased tissue. In glucose we have an agent capable of absorbing, or rather of occluding, free iodine so that this metalloid cannot be detected by either odor or taste, and thus combined can be administered in much larger doses than formerly employed without producing unpleasant symptoms. Another advantage in giving iodine occluded by glucose is found in the fact that as this substance occurs normally in the contents of the small intestine, in the chyle after the use of amylaceous and saccharine food, in the blood of the hepatic veins, and in the tissue of the liver in the form of glycogen, it is probable that glucose in thus occluding free iodine is itself protected from chemical change during the process of digestion by the antifermentative quality of the latter, and hence may be readily absorbed into the circulation, carrying in its embrace the iodine to be liberated during the morphological changes that occur prior to the formation of new blood-corpuscles. In the formula, thirty grains of iodine are dissolved in four ounces of water by means of one hundred and fifty grains of potassium iodide; to this solution is added twelve ounces of syrup as prepared by the sugar-refineries and sold by grocers under the name of golden syrup, or sugar-house syrup, or molasses. This syrup contains glucose in combination with organic matter, and answers the purpose quite as well as glucose manufactured from starch by the action of sulphuric acid, or other glucosides furnishing this substance in an isomeric form. In the *Medical Record* for June 13, 1891, DR. F. P. MANN gives the following formula as representing the best combination for iodine and glucose, with the caution that simple syrup must not be substituted, for this, containing entirely crystallizable sugar, will not take up the iodine, and the result will be a strong solution of iodine, which cannot be taken without serious inconvenience. Dr. Mann writes that he has produced the most satisfactory, even remarkable, results, where potassium iodide or syrup of the iodide of iron had signally failed, with the following formula:

℞ Iodinii, ʒss;
Potass. iodidi, ʒiiss;
Aquæ puræ, ℥iv;
Syrup. fuscus, ℥xii;
Ess. gaultheriæ, ʒii. M. Fiat sol.

Sig.—Take a tablespoonful between each meal with a little water. (Syrupus simplex must not be used.)

He advises when using this formula to keep the preparation for about twenty-four hours before commencing its use, as from six to ten hours are required in which to completely occlude the free iodine. He adds that a larger proportion of the free iodine can be given than the above, and the preparation of the free iodine can still remain odorless and tasteless so far as free iodine is concerned; though where a stronger combination is employed it would be advisable to commence with a smaller dose and increase it gradually.

ALBUMINURIA IN PERSONS APPARENTLY HEALTHY, AND ITS RELATION TO LIFE INSURANCE.

In the *Medical Record* for June 13, 1891, DR. WILLIAM B. DAVIS publishes a paper read before the Association of Life Insurance Directors at their meeting held in New York on May 29, 1891, concluding with the following general rules:

General Rules.—1. There should be nothing in the family history indicative of heredity of Bright's disease, and there should be no symptom of renal disease in the personal history except albuminuria.

2. The candidate should be under forty years of age, in good health, and there should be no history of gout, rheumatism, syphilis, lead-poisoning, nephritis, intemperance, chronic dyspepsia, or dropsy.

3. There should be no indication of hypertrophy of heart or increased arterial tension, no accentuation of the aortic second sound, and no palpitation or dyspnœa.

4. There should be no retinal changes.

5. The color, density, and quantity of the

twenty-four hours' urine should be normal, or it may be darker in color and heavier in density.

6. The specific gravity of the twenty-four hours' urine should not be below 1.020. It may range from 1.015 to 1.030.

7. The precipitated albumen should not exceed one-eighth of the urine.

8. There should be a period of the twenty-four hours when the urine is free from albumen.

9. The urine, as a rule, should contain no tube-casts. When, however, the specific gravity and quantity of urine are normal, the presence of a few hyaline casts have no serious import.

When the above conditions have been met, and we are convinced of the ability of the medical examiner, and are satisfied with the completeness and carefulness with which the investigation of the case has been made, I think we can safely approve the candidate for a short endowment policy.

To a person who has passed the above gauntlet and been subjected to a rigid medical examination, this action will doubtless appear illiberal, but until the clinical significance of albuminuria in persons apparently healthy has been finally determined by observations upon one full generation, we cannot, and probably ought not, to expect life assurance companies to do any better for them.

TREATMENT OF DIPHTHERIA.

Dr. Guntz, of Dresden, has had great success in the treatment of diphtheria with bichromate of potassium in water containing carbonic acid, which he has found by numerous experiments on animals, as well as in the course of extensive clinical observations, to be entirely harmless. For an adult six hundred grammes (about a pint) are ordered per diem, in which are dissolved three centigrammes (about half a grain) of potassium bichromate. The whole quantity is directed to be taken in about half a dozen doses, regarding which it is important to observe that they must not be taken on an empty stomach; a little milk or gruel should, therefore, be swallowed before each dose. Children, of course, take smaller quantities, according to age. They can be given the medicine in a tumbler, mixed with some fruit syrup, and they do not generally object to it. At the commencement of the disease, Dr. Guntz washes the mouth out with a one per cent. solution of permanganate of potassium containing one per cent. of thymol, or with a corrosive sublimate solution of the strength of 1 in 3000, taking care, in the latter case, that none is swallowed, and that the mouth is well rinsed with water afterwards. In the case of young children, the pharynx must be brushed out with the solution. Sometimes iodoform is employed, being applied on the tip of the finger to the affected spots. Dr. Guntz specially remarks that potassium bichromate, though harmless in the way described, is by no means so when in pills, powders, or in solution in non-carbonated water.—*Lancet*, March 28, 1891.

DRAINAGE IN ABDOMINAL SURGERY.

At the meeting of the New York Academy of Medicine, held May 19, 1891, Dr. D. P. Allen, of Cleveland, Ohio, in a paper with this title, considered the subject under three heads (*New York Medical Journal*, June 13, 1891).

The first proposition was as to whether drainage of the abdomen after operation was ever desirable. He presumed that in these and all kindred operations the use of the drainage-tube had considerably diminished. He very rarely used it, seeking, in amputation of the breast or limbs, to stop all oozing before closing the wound, to keep it strongly pressed together during the insertion of the sutures and the application of the dressings, and by the pressure of the dressings so to hold the surfaces in apposition as to obviate the collection of secretion. By this method the rule was to secure union by first intention without the drainage-tube. The same conditions existed to a degree in the abdominal cavity, and that its surfaces came in contact was, he thought, evidenced by the fact that in attempting to insert the hand into the abdominal cavity, especially if the anæsthesia was not complete, the omentum and the intestines inserted themselves between and separated the fingers in spite of the operator's efforts to prevent this. Notwithstanding, however, the close apposition which existed between the abdominal viscera on account of the intra-abdominal pressure produced by the tonicity of the abdominal wall and the distention of the intestines by gas, accumulations of fluid took place in the abdominal cavity. A common instance of this was ascites. Doubtless, after laparotomy, fluids might collect in the abdominal cavity, in spite of the apposition of surfaces and the

existing pressure, but he strongly suspected that this occurred chiefly where there was bleeding from vessels of some size, or where the pre-existing condition of the peritoneum was such as favored the pouring out of fluid. His observation would lead him to doubt whether the collection of fluid was, as a rule, great under other circumstances, unless sepsis was present or strong antiseptic solutions were employed. While on the one hand it must be acknowledged that by apposition and pressure we could not escape the collection of fluids in the abdominal cavity to the degree which might be done in wounds more subject to pressure, on the other hand the lining membrane of the abdomen was especially able by its power of absorbing fluids to care for and remove accumulating secretions. If, then, there were certain forces tending to restrict the accumulation of fluid in the abdominal cavity and also a well-marked force for removing such accumulations when they occurred, the question arose as to what fluids might safely be left in the abdominal cavity to be cared for by natural means and what ones must be artificially removed. Those fluids which could be safely left to care for themselves were (1) serous oozing from wounded surfaces and (2) small amounts of blood collecting from the same sources. Those which it would be dangerous to leave were (1) large amounts of blood and (2) septic or infectious material. That collections of serum were readily absorbed from the abdominal cavity was unquestionable. He believed the same to be true of small collections of blood. Beyond question, however, the leaving of large amounts of blood to become organized was fraught with danger, since blood-clots seemed particularly susceptible to infection and decomposition, and patients weakened by the loss of blood had less power to resist a slight degree of infection, which they might do under more favorable circumstances.

The question now arose, Had we means of drainage efficient in removing fluids which might collect in the abdominal cavity. He had been surprised in many cases where he had used the drainage-tube to find how small an amount of fluid escaped from it. Doubtless there were instances in which the amount of fluid drawn away from the abdomen by drainage was very great. Though he could not demonstrate it to be a fact, he surmised that cases in which large amounts of serum were removed by the drainage-tube were those in which there was a tendency of this fluid to accumulate before the operation, and that the fluid was not the product of divided adhesions.

Evidently it would be impossible to discuss all conditions which might arise. We might, however, discuss those which were most common. Perhaps this could be done most rapidly by citing briefly, in connection with some of these conditions, a few cases. As to the cases in which drainage should be employed: The abdominal cavity should be drained (1) in septic peritonitis. Wherever found, septic matter should be removed, and this was nowhere truer than in the abdominal cavity. It should be effected in any direction requisite for its perfection, whether ventral, vaginal, or lumbar. 2. In gunshot wounds drainage was rarely indicated. In the few cases he had seen he had been surprised at the small amount of extravasated fæcal material, even when the lumen of the gut was largely destroyed. All that could be accomplished would be gained by thoroughly cleansing the abdominal cavity without drainage, for it would be difficult by any arrangement of drain, unless it was the tampon of Mikulicz, to procure drainage in these cases. 3. In tubercular peritonitis, when the fluid produced by the tubercular process was contained in a cavity occupying the pelvis and the lower part of the abdomen, and was shut off from the upper portion of the abdomen by adhesions among the intestines, he could not imagine that such cavities could be successfully treated in any other method than by drainage. 4. Operations for perityphlitis. Where pus was present, and where adhesive inflammations had prevented its invasion of the general peritoneal cavity, drainage was, of course, in place. Where the infection had generalized itself over the abdomen, the treatment must be the same as for septic peritonitis from other causes, and thorough cleansing and drainage were indicated. 5. Intestinal obstruction, whether the result of volvulous adhesions or constricting bands, was in early stages often accompanied by the effusion of serum. Afterwards this disappeared, became absorbed, and there remained plastic lymph, gluing the intestines together. If operation was done early in these cases, the serum was, he thought, not septic, and did not require drainage. Although he had not seen enough of these cases to reach a definite conclusion, the impression had grown upon him that in an early stage, when free fluid was present in the abdominal cavity, they were favorable for operation, and that this fluid was not septic and did not need to be drained away. Sub-

sequently, when the fluid had disappeared, there was a deposit of plastic lymph with adhesions and infection, rendering operation more dangerous and drainage important. 6. Hemorrhage. When this occurred in considerable quantities and could not be controlled, it was, doubtless, best that it should be removed. It was, however, better to take good care that much hemorrhage did not occur than to seek to escape its dangers by drainage. 7. Extrauterine pregnancy. In operations for this condition there were cases in which it was impossible to control bleeding, and in which drainage was important. If the operation was upon the tube which had just ruptured, and the tube and blood could be thoroughly removed, drainage might or might not be employed, according to the completeness of the operation. But there were many cases in which the products of the extrauterine gestation could not be completely removed, or in which the removal of the adherent placenta would be unwise, in which drainage must be employed. 8. Adhesions. It was the speaker's belief that divided adhesions did not furnish in themselves cause for drainage. Uncontrolled hemorrhage was, as had been stated, a cause for drainage, but not the adhesions in themselves. In some cases of ovarian tumors of enormous size, where the adhesions had been universal and dense, and where their division had been accompanied by extensive hemorrhage, he had tied all bleeding points, at times applying cloths wrung out with hot water, well up to the base of the mesentery in the lumbar region, and had closed the abdomen without drainage, and the patients had made a complete and uninterrupted recovery. 9. The escape of cyst contents into the abdominal cavity. When this occurred and the material was infectious, no precaution for its removal could be too great, and, in addition to washing, drainage was doubtless in place. In other cysts he did not believe this necessity existed. The contents of simple ovarian cysts seemed to be innoxious. He had had a large amount of fluid from a cyst of the pancreas escape into the abdomen, which had been removed by washing without drainage, in which recovery had resulted. 10. Pyosalpinx. Opinions differed more with refence to the drainage-tube in this than in any other disease. If pus-tubes could be removed without rupture and the uterine extremity of the tube be disinfected or seared with the actual cautery, drainage was unnecessary. If, on the other hand, pus escaped or we were uncertain as to infection, or if a part of the ruptured tube should remain, it would be wise to drain. 11. Pelvic abscess. In this condition not only should the pus be removed at the time of operation, but the escape of that which formed subsequently should be secured by means of drainage.

What method of drainage should be employed? Vaginal drainage, which had been much employed, was now largely discarded. The two methods now generally used were with the drainage-tubes placed in the abdominal incision, and with the tampon of Mikulicz. The former was of more universal application, being especially fitted to prevent the accumulation of fluid in the pelvis. The Mikulicz tampon was especially effective for those cases where localized septic infection took place, as in pelvic abscess, ruptured pyosalpinx, and advanced extrauterine pregnancy.

THE TREATMENT OF OSTEOMALACIA BY CASTRATION.

HOFMEIER (*Centralblatt für Gynäkologie*, No. 12, 1891) reports the case of a virgin, aged 30 years, who had osteomalacia of three years' standing, the disease being progressive at the time of operation, as shown by the presence of severe pains in the pelvic bones, inability to walk, and marked pelvic deformity. Menstruation regular and painless. Four weeks after removal of the ovaries, the patient could walk without assistance, and the pains were much less severe. She received cod-liver oil and peptonate of iron; six weeks later she felt quite well, had no pain, and could walk a long distance. The pelvic organs were normal. The ovaries were atrophied, as in a woman after the menopause, and presented a similar appearance microscopically, only a few ovisacs being seen. The case was interesting, not only because the patient was a virgin (hence pregnancy could not be regarded as an etiological factor), and there was no disturbance of menstruation, or evidence of pelvic congestion.

As regards the effects of castration under such circumstances, the writer admits, with Fehling, that it is impossible to give a satisfactory explanation. It may be due to some reflex action upon the vaso-motor nerves supplying the nutrient vessels of the pelvic bones, the disease itself being regarded as a trophoneurosis of the bones directly dependent upon ovarian activity. This theory receives additional support from a similar case reported by Truzzi. Fehling has collected twenty other

cases of castration for osteomalacia, in none of which was there a failure on the part of the operator to secure at least a temporary benefit.—*American Journal of the Medical Sciences*, July, 1891.

THE TREATMENT OF ERYSIPELAS.

In the *American Journal of the Medical Sciences* for July, 1891, DR. CHARLES P. ALLEN publishes his conclusions as to the best method of the treatment of erysipelas, based upon his personal experience in the treatment of fifty-six cases and the reports of four hundred and sixty-six cases occurring in the Charity Hospital, New York. In the first place, he recommends internally such symptomatic treatment as the nature of the case seems to require. Antipyretics only in case of high or persistent fever (over 103½° to 104°); then antipyrin in dose of at least gr. xv to xx for an adult, guarded by alcohol; cooling drinks. Calomel or saline aperients in full dose if constipation. If much weakness, alcoholic drinks given freely, especially at critical periods, and iron or iron and quinine; digitalis if much fever and prostration; bromide for delirium; antipyrin or phenacetin for headache, with cold applications to head, and as concentrated and nutritious a diet as possible.

Second, locally, he paints the patch and surrounding margin of the healthy skin thickly with ichthyol in collodion, ʒi to ʒii to ʒi. If the scalp is the region affected, a watery solution or ointment of ichthyol can be employed. To arrest the spread, he makes an attempt either with the band of adhesive plaster or by scarification, or both, the latter to follow the former, in case the disease spreads beyond the adhesive strips. In erysipelas of the face, which had not yet reached the forehead, or at least its upper part, he would apply a band tightly about the forehead and just above the ears, cutting the hair in a strip around if necessary to secure firm pressure. The chances of arresting the process here should be at least equal to those of checking the spread upon an extremity, for we have a hard bony base over which to make our compression. If the boundary is passed, then he should at once have the scalp shaved and apply another band higher up. The hair should be cut in any case in which the scalp is invaded or threatened. Then the same application of ichthyol in collodion can be made, as to the face or other part. If there be much tension, swelling, heat, and discomfort (which is not apt to be the case under collodion), any oily substance can be applied over it.

In treating erysipelas, the uncertainty of *prognosis* must always be kept in mind. Cases, to all appearances mild in the beginning, may become severe and prove fatal, while formidable-appearing areas may suddenly cease spreading spontaneously. It is scarcely more safe to say a case will progress favorably (though the great majority do) than to claim that the particular line of treatment instituted has prevented an unfavorable termination, or proven abortive, unless a whole series of cases under a given method have terminated in a shorter than the average time.

Naturally, when the erysipelatous process has its sources in a pus collection, such as an abscess, pustule, ulcer, foul wound, carious tooth, diseased duct, etc., the first care must be to secure as prompt and thorough disinfection and cleansing as possible. Pus must be destroyed and purity maintained. A solution of the peroxide of hydrogen will often be found useful in effecting this purpose. In such case a spontaneous halt may be hoped for. In the same way a diseased mucous membrane must be cared for; excoriations, ulcerations, rhinitis, or other disease of the nasal mucous membrane or affection of the throat must be looked after. It is probable that every case of facial erysipelas starts from local solution of continuity either upon the skin or adjacent mucous membranes, and we simply call some cases "idiopathic" or "genuine" when we fail to find the point where the micrococci have entered.

As a prophylactic measure in those predisposed to repeated attacks, great care should be taken to discover and cure affections of mucous membranes, carious teeth, ulcerations, or other disease processes or conditions as possible means of maintaining the tendency. Recurrences after apparent cure must be kept in mind and treatment continued sufficiently long to prevent them.

ASTHMA IN CHILDREN.

DR. R. BLACHE (*L'Union Médicale*, 1890, No. 133) defines asthma as a bulbous disease, in which attacks are produced by impressive irritations of the vagus or peripheral nerves, particularly the trigeminus; the reflex action manifests itself by successive or simultaneous spasms of all the intrinsic inspiratory muscles,

intercostals, scalenæ, trapezii, etc., and by a tetaniform contraction of the diaphragm.

Blache thus classifies the disease into three forms,—pneumobulbous asthma, essential or nervous asthma, emphysematous or alveolar asthma, catarrhal or bronchitic asthma.

Nervous asthma governs all asthmatical pathology of children. A class of asthma in infantile pathology which holds a place whose importance increases every day as the pathogeny of the affections are better known, is the class of reflex asthmas in general; these are the cases in which the bulbous irritation does not leave the broncho-pulmonary filaments of the pneumogastric. The bulb is then impressed by an excitement springing from all the peripheric branches of the vagus, but again from the other nerves,—as the trigeminus and the cutaneous nerves,—so that nasal asthma, pharyngeal asthma, amygdaline, gastric asthma, and cutaneous asthma belong to the category of dyspnœas. Nasal asthma has only been known a few years; Voltolini, in 1874, published the first facts relating to mucous polypi determining the approach of transient dyspnœa. Mucous polypi are rare in children; but, on the contrary, adenoid tumors are very frequent and a usual cause of nasal asthma. Hypertrophic rhinitis is also a frequent cause; this may be a primary disease or follow successive attacks of acute coryza, or infectious fevers, as measles and typhoid fever; it may be secondary to another nasal lesion, malformation of the nose, deviating thickness of the partition, foreign bodies, affections of the naso-pharyngeal canal, catarrh, and adenoid growth. More than this, this rhinitis is at times connected with diseases which attack the stomach (Bouchard, Ruault), the intestines (Secchi, Buck), genital apparatus (J. Mackenzie, Joul).

When such a child, predisposed to bulbous irritability, either by diathesis or heredity, and to nasal erectibility following the preceding lesions, an attack of asthma may be brought on by congestion following cold, by the action of vegetable or animal powders, by the influence of odorous matters, by the contact of a probe on the pituitary gland, by an untimely nasal irrigation, and by remote causes, stomachic, intestinal, or genital excitations.

The treatment recommended for the attack is fumigation by belladonna cigarettes, henbane, or the leaves of datura, stramonium, nitre-paper, inhalations of oxygen, or ioduret of ethyl, but in many cases the hypodermic exhibition of morphine will be required to produce even momentary relief. In a general way, opium ought to be very prudently used with children; belladonna is much safer and can be used longer. Bretonneau and Guersant mix one centigramme of the extract to one centigramme of the powder of belladonna, giving this each day, and continuing for some time. The tincture of lobelia inflata may be given in a dose gradually raised from 20 to 100 drops. Moncorvo remarks that the endurance of children for the treatment permits him to raise the dose 10 and 12 grammes in twenty-four hours. Blache has obtained excellent results from tincture of grindelia robusta, which he gives to children in doses of from 15 to 60 drops. Inhalations of vapor of pyridine, advised by M. Sée, have helped Blache to lessen the force of the attack. According to Laborde and Daudrie, this substance lessens excito-motor force, dilates peripheral vessels, and has a paralyzing action on the vaso-constrictor nerves; hence, it increases the fulness of respiration, at the same time the respiratory movements regulate themselves and diminish in frequency. The curative treatment of asthma limits itself to the almost exclusive use of iodine, particularly the iodide of potassium. The anti-dyspnœic effects of this agent on the brain, and particularly on the bulb, are certain; Binz states that it paralyzes the nervous functions and produces narcotism; in every case it moderates the exciting power of the vital centre and regulates the distribution of the nervous influx.

Asthmatics presenting hyperæmia of the nasal mucous membrane are more easily affected with iodism. In cutaneous asthmas iodine may also be contraindicated as aggravating the skin condition. At times the emaciation and loss of strength make it necessary to interrupt the treatment. Pyridine by aspiration, tincture of grindelia, arsenic, and aerotherapy by compressed air are, then, the only means which remain at the disposition of the practitioner. The iodine treatment is applicable to non-diathetic asthma; it is contraindicated when the disease has a telluric or hereditary origin,—for example, in the arthritic or gouty,—a medication favoring incomplete nutrition or modifying the morbid secretions will be indicated. Asthmatics tainted with paludalism will require quinine in combination with iodide of potassium.

Blache agrees with Simon that the value of certain health-resorts cannot be overestimated; the former gives preference to the waters of Mont-Doré, stating that their sedative and decongestive properties have pro-

duced good results, particularly in the pneumobulbous form; in herpetic asthma children as well as adolescents will find the sulphurous medication good. Bigorre, Saint-Honoré, and Alevard may be recommended.—*American Journal of the Medical Sciences*, July, 1891.

THE MANAGEMENT OF LITHÆMIA.

At the meeting of the Post-Graduate Clinical Society, held March 28, 1891, DR. ANDREW H. SMITH read a paper on the "Management of Lithæmia" (*Post-Graduate*, July, 1891), in which he said that he did not think we could assume that there was such a thing as lithuria without lithæmia, although we may have lithæmia without lithuria, in the sense of a deposit of lithic acid or of lithates in the urine. Lithæmia might be a condition and not a disease. Thus, we might have an excess of lithic acid in the blood without any symptoms of disease accompanying it, and, if we considered this a morbid condition of the blood, it might come within the definition of a disease; but there are many people who constantly exhibit deposits of lithic acid or urates, and yet they are in perfect health; and, again, the condition is frequently temporary and dependent upon exhaustion from severe muscular effort or upon a transient indigestion. If a disease, there should be associated with the cases of lithic acid in the blood some symptoms. It was probable that so long as the uric acid was freely eliminated it might be formed in considerable excess without disturbing the system; but if, for instance, there were an acidity of the blood brought about by an imperfect digestion or assimilation, it would be possible for the acid to be precipitated in any part of the body, thus giving rise to disturbance of function of those parts. Where lithic acid was deposited in the tissues in combination with bases, we had the symptoms familiar to us in gout.

As to the diagnosis, Dr. Smith said we were apt to find a symptom group made up about as follows: The patient, without being positively ill, did not feel well, and suffered either from mental hebetude or from irritability; or there might be insomnia, digestive disturbances, increased after eating; generally there was constipation, frequently hemorrhoids, and often certain affections of the skin, such as lichen or eczema. Such patients frequently complain of giddiness and of specks before the eyes; but irritability of temper was a very prominent symptom; neuralgic pains, and aching and weariness of the limbs, are common. There is usually a deposit in the urine, either brownish or pinkish, consisting of crystals of uric acid, stained by certain coloring-matters in the urine, or of crystals of lithic acid in combination with sodium, ammonium, or magnesium. This deposit occurs when the urine cools, and redissolves on heating. It is not soluble in the acids, except sulphuric acid, but is readily soluble in alkalies; the urine is always acid, and it is this acidity which throws down the crystals of uric acid. From a clinical stand-point it was interesting to determine how far the uric acid was responsible for the symptoms which are associated with this condition. He thought we could hardly consider it settled whether the uric acid itself was the formation or the result. The determination of this question would probably involve the determination of whether uric acid was formed in excess, or whether, when in normal quantity, it is deposited under certain abnormal conditions. For instance, if there were imperfect digestion and malassimilation, with consequent throwing into the blood of the products of fermentation, the acids produced might cause the deposition of the uric acid. It was certain that these symptoms were not uncommonly met with without any marked deposit of uric acid or lithates in the urine. However, if this condition be attacked by remedies upon the supposition that uric acid is the foundation of the trouble, the treatment is usually successful. Besides the formation of bile, the liver has the glycogenic function, and functions connected with retrograde metamorphosis, and probably the failure of lithic acid to be oxidized into urea is due in part to the defective action of the liver. This conclusion would seem to be a fair one from a clinical stand-point, for mercurials and also nitric acid have a peculiar action on the liver, and are peculiarly efficacious in lithæmia.

Clinically, this condition is presented to us, first, among people who do not take enough exercise in proportion to their eating; and, secondly, in a class of persons who are moderate eaters, but are of a highly nervous organization, and in this class the symptoms usually develop as the result of nervous strain, long-continued anxiety, or mental labor. The importance of bearing in mind these two classes is evident in the management of these cases. In the first class we would employ vigorous purgation, whereas in the second class the treatment would be rather of a tonic nature.

Management.—First, as to the matter of diet. As uric acid is a nitrogenous substance, we would naturally think that it would be sufficient to deprive the patient of nitrogenous material; but the habit of excreting such material still continues, even though it be withheld from the dietary. It is like a spendthrift, who cannot be cured by withholding money from him; he must be educated to better habits. Just as the spendthrift will pawn his clothes to get money, so the system will pawn the tissues, so to speak, to obtain nitrogen. Formerly it was supposed to be essential to withhold nitrogenous food, but few insist upon this point now. The great point is to secure a diet which will be readily assimilated, no matter what its composition; for any other diet will inevitably result in the production of various fermentative products, acids, etc., which will derange the metabolic processes more than would result from a little, more or less, of some one constituent in the food. If the food occasions the patient distress soon after its ingestion, it can be assumed that the trouble is in the digestion of the albuminous materials. On the contrary, if the disturbance occurs later,—in other words if the indigestion be intestinal,—we may say in a general way that the difficulty is with the carbohydrates and the hydrocarbons,—the starches, sugars, and fats. The diet should be regulated tentatively, and then the further management of the case will depend upon which of the two classes the case belongs to. If the patient be plethoric, saline purgatives are valuable. Sir Henry Thompson considers the sulphate of soda particularly valuable, and he bases this view upon the fact that it purges by exciting elimination from the glandular structures, rather than by increasing peristalsis or osmosis, as is the case with the other saline cathartics; and, in addition to this, it acts decidedly upon the liver. A course of purgations with salines, or with Friedrichshall, Hunyadi, or similar waters, is appropriate for the first few days. After this nitric acid should be administered for a week or two, and then a persistent coarse of alkalies should be given. Alkaline waters present the alkali in an agreeable form, and they insure the patient's taking a large quantity of fluid, which is necessary in these cases in order to secure a thorough action of the kidneys and bowels. In this country the most decidedly alkaline is the Saratoga Vichy. Waters containing lithia are especially valuable, for the reason that a smaller quantity of lithium will neutralize a given quantity of acid than almost any other alkali or alkaline earth; thus, seven grains of lithium will neutralize as much acid as twenty-three grains of sodium or forty grains of potassium. The three prominent lithia springs are the Buffalo Lithia, Farmville, and Londonderry, the latter being the strongest. The waters should be taken for a long time, and in sufficient quantity to keep the urine very feebly acid.

Where the nervous symptoms predominate largely over the digestive disturbances, active purgation is not desirable; the object of treatment should be to conserve the deteriorated forces, and in some cases it has even been suggested that the patients should be kept in bed. Appropriate tonics are indicated. Lithæmia being a condition of imperfect oxidation, it may be said that free exercise in the open air is a *sine qua non* of treatment. Neurasthenic patients, however, will need the open air without muscular exercise, and, therefore, carriage-riding is appropriate.

One manifestation of lithæmia had come under the speaker's notice in which there were digestive disturbance, palpitation of the heart, and insomnia. This combination was most commonly found in the neurasthenic cases, and if their common origin is not recognized the patient is apt to be treated for each condition separately. The speaker referred to a severe case of this kind in which, after long symptomatic treatment, the patient was much worse and contemplated suicide. In that case the speaker employed lavage with the happiest results. The digestive disturbance was at the foundation of the difficulty, probably owing to fermentation in the intestinal canal. The cardiac palpitation arose from the same cause, and it was this that prevented sleep. With the relief of the dyspepsia all the symptoms quickly disappeared. In this class of cases, he believed lavage very useful, not only because of the local effect of the water upon the stomach, but the flushing of the stomach with large quantities of warm water provided for a very rapid absorption of this water, and its speedy conveyance to the portal circulation. In some peculiarly obstinate cases it might be well to employ the iodide of potassium, and occasionally colchicum might be useful, but he would not give it in any case where there was irritability of the stomach, and it should be given cautiously. Any kind of treatment which will facilitate digestion will be beneficial in lithæmia,—any one of the recognized digestive agents may prove beneficial.

THE TREATMENT OF ACUTE ARTICULAR RHEUMATISM BY HYPODERMIC INJECTIONS OF CARBOLIC ACID.

As long ago as the year 1875, Professor Senator read a paper before the Berlin Medical Society on the "Treatment of Acute Articular Rheumatism by Hypodermic Injections of a Strong Solution of Carbolic Acid in the Neighborhood of the Affected Joints." He pointed out that marked alleviation of the local, and some amelioration of the general, symptoms quickly ensued, and that without any appreciable ill effects to the patient.

In the *Medical Press and Circular*, June 17, 1891, MR. A. L. GILLESPIE states that he has tried this treatment in about twenty-four cases, and that in all instances the results were quite as satisfactory as the five cases reported in detail in which the hypodermic injection of from 2 to 5 minims of a ten per cent. solution of carbolic acid relieved the pain almost entirely within a few hours. In all these cases the salicylates had proved inefficacious.

Having regard to the speedy relief afforded in the first four cases, this procedure seems to merit some attention, for though it might appear somewhat heroic to inject into or close to acutely-inflamed joints a strong solution of carbolic acid, yet the relief afforded was so great and welcome that the patients often begged for a repetition of the injection when another joint became painful. The short time that elapses between the injection and the cessation of pain, only half a minute in one case, the rapid return of freedom of movement, and the ease and ability to sleep thereby afforded, warrant our using it in many cases. It is of especial value in cases of gonorrhœal rheumatism, in which no good has arisen from the use of salicylates, but does not seem to act so well when many of the joints are affected.

Although the author has injected the solution directly into the distended synovial cavity of an inflamed joint without untoward results, it is safer and as efficacious to pass the point of the needle of the syringe through the skin obliquely, and, judging where the synovial membrane is, to inject the fluid as close outside the sac as possible. Injected into the sac itself a ten per cent. solution of carbolic acid precipitates the albumen present in the serous contents.

The rationale of the rapid disappearance of all the symptoms is, first, that it is due to the powerful local anæsthetic action of the acid; secondly, to some slight specific action against the rheumatic poison exerted by it. While with regard to the dose one might give, a grain of the pure acid in a child to 2 grains to 2½ grains in an adult would not be excessive.

CORROSIVE SUBLIMATE AS A DISINFECTANT.

Experiments published by DR. A. C. ABBOTT, made in the pathological laboratory of the Johns Hopkins Hospital (*American Journal of the Medical Sciences*, July, 1891) have a very practical bearing upon the value of corrosive sublimate as a germicide, and the results of these experiments lessen the high estimation in which this agent has been held by most investigators.

Dr. Abbott selected the staphylococcus pyogenes aureus for a series of experiments as to germicide power in consequence of the importance of this subject to the surgeon.

The tests hitherto made upon corrosive sublimate as a disinfectant have agreed in giving to it the first place in the list of these agents.

One method commonly employed in testing the value of any chemical substance as a disinfectant is to expose organisms dried upon bits of silk thread to its action for different lengths of time, and then, after removing and carefully washing the threads in water and alcohol, to place them in nutrient media at a favorable temperature and notice if any growth results from them. If no growth appears, the disinfection was presumably successful. Another common method is to mix fluid cultures of organisms with the disinfectant, and, after different intervals of time, a portion is taken from the mixture and placed in nutrient media just as in the other method.

Now, in both of these methods it is easy to see that, unless special precautions are taken, a minute portion of sublimate may be carried along with the thread or drop into the medium which is to determine whether or not the organisms on the thread or in the drop still possess the power of growth. For organisms in their normal condition—that is, those which have never been exposed to the action of a disinfectant—the amount necessary to restrain growth, for certain disinfecting agents, is very small indeed; and for those organisms which have previously been exposed for a time to such agents, Geppert shows, it is very much less.

In the case of the organism we are considering, Dr. Abbott finds the amount of sublimate necessary to prevent the growth of perfectly normal staphylococci to be 1 part of sublimate in 75,000 parts of the ordinary peptone bouillon, or 200,000 parts of bouillon without peptones. So that, if organisms which have been once exposed to stronger solutions of this salt (1 to 1000) require less than these amounts to inhibit their growth, it is plain that special precautions must be taken to prevent transportation of this minute trace into the nutrient medium which is to demonstrate whether or not the organisms are capable of development.

The author gives in detail a series of experiments, and draws the following conclusions:

That, under the most favorable conditions, a given amount of sublimate has the property of rendering inert only a certain number of individual organisms,—that is to say, the process is a definite chemical one taking place between the protoplasm of the individual bacteria and the sublimate in the solution.

The disinfecting activity of the sublimate against organisms is profoundly influenced by the proportion of albuminous material contained in the medium in which the bacteria are present. It was found that the relation between the golden pyogenic staphylococci and sublimate is not a constant one, organisms from different sources and of different ages behaving differently when exposed to the same amount of the disinfectant for the same length of time.

Many of the results of previous experimenters, who have assigned to corrosive sublimate more powerful disinfectant properties against the staphylococcus pyogenes aureus in cultures than the observations reported in this paper indicate, are attributable to the neglect of certain precautions now recognized as essential to the proper conduct of such experiments.

At the present stage of our knowledge in this direction it is plain that for use in surgical practice the solutions of corrosive sublimate do not possess all the advantages attributed to them.

In regard to the employment of sublimate solutions upon wound surfaces, it is plain that there exist at least two serious objections,—first, the albumen of the tissues and fluids of the body tends to diminish the strength of, or, indeed, renders entirely inert, the solution employed; and, second, the integrity of the tissues is materially injured by the application of this salt. The first objection cannot be met with certainty, for the surgeon possesses no means by which he can determine the amount of albuminous material with which his solutions are to come in contact, and in any case this large amount of albuminous material is an almost insuperable obstacle to complete disinfection with sublimate. He is, therefore, in a position to say, *a priori*, that his efforts at disinfection of the wound are or are not successful.

During the past two years we have had sufficient evidence to lead us to believe that the normal tissues and fluids of the body possess the power of rendering inert many kinds of organisms which may have gained access to them. This function is, therefore, diminished, or, indeed, may be quite destroyed, by any agent which brings about alterations in the constitution of these tissues. We know that just such changes as those to which we refer are known to follow the application of sublimate solutions. It is plain, then, if we bring about in these tissues a condition of superficial necrosis,—the condition following upon the application of sublimate,—they are much less able to resist the inroads of infectious organisms than they would have been had they been left in their natural condition.

As a disinfectant, in the strict sense of the word, there are, perhaps, few substances which possess the property in a higher degree than does corrosive sublimate, but at the same time there is nothing which is employed for this purpose that requires greater care in its manipulation, in order to obtain its best results, than does this salt. In practice its action is influenced by a number of conditions, which it is difficult, if not quite impossible, to control.

For these reasons we seem hardly justified in continuing to give to it the first place in the list of substances which may be employed practically for the purpose of rendering harmless materials containing the germs of infectious maladies.

SALICYLBROMANILIDE.

This synthetic compound, to which the proprietary name of "antinervine" has been given, is a combination of bromacetanilide and salicylanilide, and is supposed to possess the properties of antifebrin, bromine, and salicylic acid, without their unpleasant effects, and may consequently be supposed to have

antipyretic, antineuralgic, and antinervine properties. It is a white, crystalline powder, having a rather pleasant, slightly acid taste, feebly soluble in cold water, but dissolves freely in hot water, alcohol, and ether.

Dr. C. S. Bradfute, who writes in the *Cincinnati Medical News* for June, 1891, states that the dose is from 3 to 10 grains, and is best given in the form of compressed tablets or in simple powders. Dr. Bradfute suggests that, for the sake of brevity, this compound be termed "salbromalide."

The claim has been advanced that salicylbromanilide is of value in diabetes, but Dr. Bradfute was not able to confirm this statement. It seems, however, that this compound is effective as a reliever of pain and those functional disturbances of the circulatory system which occur at the onset of acute diseases, and although its power of reducing the temperature is undoubted, it should be given carefully in states of hyperpyrexia on account of its action on the heart.

A glance at the physiological action of the three agents comprising salicylbromanilide shows that they are essentially circulatory depressants. Salicylic acid acts directly on the heart-muscle, lessening its electro-contractility, and, when administered in toxic doses, causing the organ to stop in diastole. After a preliminary period of stimulation, it depresses the vaso-motor centres. Antifebrin acts very similarly, though its effect upon the heart and vessels is more powerful, producing a rapid fall in the blood-pressure and a weak and irregular heart. Bromine, in addition to its impression upon the heart and vaso-motor nervous system, lowers the vital activity of the centres in the *medulla oblongata*, and interferes with the function of conscious cerebration in a way not yet clearly understood.

It can thus be seen that a compound made up of these three substances, when given in full physiological doses, would probably exhibit an action upon the system manifested by a profound interference with the motor mechanism of the circulatory apparatus, and that whatever therapeutic value could be attached to it, from a pharmacological standpoint, would depend upon this action.

In a series of experiments conducted in the therapeutic laboratory in the Jefferson Medical College, the writer's observations were confirmatory of the above remarks. He found antinervine a profound depressant of the circulation, and a prompt antipyretic. Three grains ejected into the lymph-sac of a medium-sized frog produced death in one hour without convulsions, the animal becoming languid and indifferent to mild stimulation after a lapse of ten minutes, and passing rapidly into stupor, and finally died in a condition of coma, with the muscular system completely relaxed. The reflexes gradually diminished during the course of the poisoning, and were totally absent eight minutes before the cessation of the circulation.

A similar quantity was injected into a frog so prepared that the movements of the heart could be observed *in situ* and the capillary circulation watched under the microscope. The cardiac cycle was observed to gradually and uniformly become longer, the contractions lessened in vigor, the ventricle contracted more slowly than the auricles, reacting lazily to an electric current, and finally the heart stopped in diastole, spreading out like mush when removed from the body and placed upon a glass plate. The capillaries dilated, slowly and irregularly at first, but fifteen minutes before death relaxed entirely, and the blood-current diminished in rapidity in proportion to the capillary paresis and the cardiac depression, the corpuscles tumbling along against each other and showing a tendency to adhere to the vessel wall. Death occurred in forty-six minutes.

The behavior of the heart in the above experiment indicated the poisonous effect of the drug directly upon the organ, but in order to prove this the heart of a healthy batrachian was taken out of the body and placed in a Kronecker-Bowditch apparatus. Here, removed from the influence of the central nervous system, a solution of antinervine was permitted to flow, by means of a perfusion canula introduced into the ventricle, slowly through the heart, and the results observed were the same as those noted when the heart was *in situ*. A control experiment eliminated any undue influence upon the heart from the damage it sustained in placing it in the apparatus.

Upon the rabbit the drug acts very much the same as upon the cold-blooded animal, and its influence over the respiratory movements, which is more distinct in warm-blooded animals, shows the part played by the salicylic acid in the general result. Respiration became rapid, weak, shallow, and stopped before the heart, the latter becoming slower and more feeble, and finally, a few minutes before the circulation ceased, would make no impression upon the drum of a cardiograph.

Guided by these experiments, the writer concluded that salbromalide was best applicable to those affections characterized by functional disturbances of the circulatory system brought about by reflex impressions or too active stimulation, and acute inflammatory conditions occurring in robust subjects. In the cases that fell in his hands, he found this conclusion correct, and noted favorable results, and in some instances obtained curative effects when other remedies had failed or acted unsatisfactorily.

ANTIPYRIN AS A HÆMOSTATIC.

Professor G. Cesari, of Modena, gives the results of some experiments on the hæmostatic influence of antipyrin applied locally (*Rassegna di Scienze Mediche*, February, 1891). He says antipyrin applied to an injured blood-vessel or to living tissues, whether in the form of fine powder or watery solution, does not irritate or dry or produce any caustic effect on the tissues or cause pain. It gives rise to local anæmia more or less marked according to the length of time the agent is applied. A fifty to one hundred per cent. watery solution produces no change in the calibre of capillaries; but if made to bathe the veins of the mesentery of a frog or the jugular or femoral vein of a rabbit, more or less perceptible narrowing of these vessels can be observed. When a fifty per cent. watery solution is applied to the frog's mesentery the circulation in the capillaries is first slowed and afterwards arrested; if the experiment is prolonged, the circulation in the larger blood-vessels is gradually stopped. While the small vessels of the mesentery and lung in the frog, and those of the ear and skin in the rabbit, become almost bloodless, after an application of a fifty to one hundred per cent. solution, the larger vessels become dark red in color. Mixed with blood just drawn from the veins of a man or rabbit, antipyrin acts in different ways, according to the concentration of the solution. If that is less than twenty per cent., the blood, if placed in a test-tube, acquires a persistent red color; and, if slight coagulation occurs, this disappears at once on merely shaking the fluid. If the same blood is mixed with thirty to one hundred per cent. solution, the color is less dark; the blood remains liquid at the temperature of the laboratory, but if kept at a temperature of 38° C., it acquires a syrupy consistence and appearance, and the test-tube can be turned upside-down without a drop of blood escaping, though there is no trace of coagulation. Antipyrin does not lower or in any way alter the blood-pressure. To sum up, antipyrin more or less speedily arrests hemorrhage from both large and small blood-vessels when applied in solutions of not less than forty, or, better, fifty per cent. The effect of the application of solutions of the latter degree of concentration is almost equal to that of the finely-powdered drug. Both the solution and the powder should be applied on plugs of cotton wool. Antipyrin, in short, if placed in contact with blood at its normal temperature, thickens and condenses it, and, without causing coagulation, prevents it from escaping from the vessels. It stops secondary hemorrhage, and is altogether, according to Cesari, a most valuable hæmostatic.—*British Medical Journal*, June 20, 1891.

SUCCINATE OF IRON.

Since succinic acid in combination with the ferric radical has recently been introduced by the medical profession, as a remedy for the relief of jaundice, resulting from obstruction of the biliary duct by calculi, and with apparent success, a demand for a preparation combining efficiency and elegance has arisen. The originator of this medicine recommends the use of the hydrated succinate of iron as the preparation by which he has obtained such good results in the treatment of the affection referred to. But the preparation is unsightly and anything but elegant as a pharmaceutical product.

Ferric succinate in a hydrated state or dried appears as a cinnamon-brown, amorphous substance quite insoluble in water. It is readily prepared by adding to a solution in water of an alkaline succinate, a solution of ferric sulphate, as long as a precipitate is obtained. In this instance a basic ferric succinate is produced instead of a neutral succinate, a portion of the succinic acid being liberated and remaining in solution.

In a paper published in the *American Journal of Pharmacy* for June, 1891, Dr. W. T. Wenzell states that the reaction takes place between one molecule of ferric sulphate and three molecules of the neutral or normal ammonium succinate, and with the assimilation of two molecules of water.

Hydrated ferric succinate occurs in the form of an amorphous precipitate, containing one molecule of water, of which it is deprived

on drying and converted in the basic salt $Fe_2O(C_4H_4O_4)_2$.

The hydrated salt is insoluble in a cold solution of succinic acid or ammonium succinate, more soluble in boiling solution, from which it separates slowly on cooling; is more soluble in citric acid and very soluble in ammonium citrate, even at ordinary temperatures. A solution of ferric succinate in ammonium citrate is quite permanent and can be mixed with succinic acid and ammonia without decomposition. An excess of ammonia merely deepens the color. The solution evaporated at a temperature not to exceed 130° F. solidifies on cooling and standing for a time in a crystalline mass. By experimental synthesis, working with exact molecular weights, it was found that three molecules of ammonium citrate were required to dissolve one molecule of the precipitated ferric succinate, and from these data the following composition of the double salt of ferric succinate and ammonium citrate has been deduced:

$$Fe_2O(C_4H_4O_4)_2,3(NH_4)_2C_6H_5O_7.$$

And from this molecular formula a working formula for its preparation has been calculated.

Liquor Ferri et Ammonii Succinatis.—Dissolve fifty grains of succinic acid in three fluidounces of water, neutralize nearly with ammonia, and dilute to six fluidounces. Transfer the solution to an eight-ounce bottle, add half a fluidounce of the officinal liquor ferri persulphatis and agitate well. Transfer the mixture to a filter and wash the precipitated ferric succinate thoroughly with distilled water. Next take eighty-nine grains of citric acid, put it into a beaker, and add with stirring a sufficient quantity of ammonia-water, until the acid is dissolved and the solution neutral. Finally, transfer the moist ferric succinate to a porcelain capsule, add the solution of ammonium citrate and dissolve, assisted by a gentle heat. The solution when diluted to measure six fluidounces will contain to a fluidrachm two grains of the ferric succinate or five grains of the double salt.

Attention having been called to the dark color of most samples of ferrous succinate solutions, the suggestion has been made that perhaps the ferrous carbonate employed in the usual method of manufacture of this salt is not entirely free from ferric salt, hence the dark color. In the same number of the *American Journal of Pharmacy*, MR. F. W. HAUSSMANN writes that in some experiments which he has made to settle this question, a solution was prepared with the employment of precipitate of ferrous carbonate, care being taken to prevent the formation of ferric salt as much as possible. The color of both solutions was identical, and on examination of a recently-prepared solution little or no ferric salt was found, hence it may be inferred that the dark color of the sample was not due to the presence of a ferric salt.

ABSORPTION OF FOOD-STUFFS AFTER EXTIRPATION OF THE PANCREAS.

Some important observations have recently been made in Minkowski's laboratory in Dorpat on the above subjects, and some of them are published in an inaugural dissertation by one of Minkowski's pupils, M. ABELMANN ("Ueber die Ausnützung d. Nahrstoffe nach Pancreasextirpation," etc., *Inaug. Diss.*, Dorpat, 1890). The experiments were made on animals—dogs—from which the pancreas was totally removed, either in one or in two operations, or in which the greatest part of the organ was excised. The most important results are the following: 1. In dogs without a pancreas, forty-four per cent. of the products of the digestion of proteids is still absorbed, while in dogs with a small part of their pancreas, about fifty-four per cent. is absorbed. If, however, pig's pancreas be mixed with the proteid food (horseflesh), a still larger amount of proteid is absorbed. 2. Carbohydrates are for the most part absorbed in dogs without a pancreas; still, twenty to forty per cent. of the amylaceous food (bread) is not absorbed. 3. After total extirpation of the pancreas, all the fat of the food appears in the fæces. This seems to be due directly to the want of the pancreas and the absence of the pancreatic juice in the intestine; for, on giving pig's pancreas along with the fats, the latter were absorbed. In this case the fats were given as neutral fats, but the same is true of fats emulsionized artificially before they were administered to the dogs. In the case of natural fatty emulsions, however,—for example, milk,—the case is different, about fifty-three per cent. of the fats being absorbed. 4. In spite of the absence of the pancreas, the fats are decomposed, an observation which confirms the well-known observations of Ogata and Cash, who showed that neutral facts were in small amount split up in the stomach. 5. When a part of the pancreas is left, a part of the fat is absorbed, and relatively more fat is absorbed when small quantities of fat are given than when a large quantity is given. Of milk, eighty per cent. of the fat is absorbed. In a second commu-

nication by Minkowski himself ("Zur Lehre der Fettesorption," *Berlin. Klin. Wochensch.*, No. 15, 1890), it is pointed out that the absorption of fats depends on the form in which they are administered. A natural fatty emulsion like milk, and the emulsion normally produced by pancreatic juice, have certain characters in common, and differ from simple soap emulsions produced by alkaline carbonates. Simple alkaline soap emulsions are at once destroyed by the addition of an acid, while the fatty emulsion of milk, as well as that of the pancreatic juice, resist the action of acids. The importance of the pancreatic juice for the absorption of fats may depend on its power of forming an emulsion of this sort.—*Chicago Medical Recorder*, May, 1891.

ADAPTATION OF DIFFERENT ORGANS TO THE PROLONGED USE OF ATROPINE.

Little is at present generally known concerning the effects of the prolonged use of atropine. The most extensive experiments on this subject were made by Anrep (*Pflüger's Archiv*, Bd. xxi.), who observed that in dogs tolerance of the drug was easily producible, especially on the part of the nervous system and of the heart. He concluded that repeated injections of atropine gradually paralyzed the vagus endings in the heart, and that the motor ganglia were also depressed, so that the heart reacted less and less to the drug; finally, the heart became weakened, and was no longer able to accomplish the same number of beats as in the normal state. Dr. Luigi Sabbatino (*Lo Sperimentale*, May 15, 1891) has brought fresh evidence to bear on this subject, and has come to the conclusion that some of Anrep's results are only partially true. He finds (1) that the vagus adapts itself to the action of atropine, so that small doses, which will at first paralyze it completely, will, after a few repetitions, fail to produce paralysis; (2) that the adaptation of the heart to the drug is not due to depression of the motor ganglia, for, in his experiments, the heart-beats never slowed after the injections, but, on the contrary, were always quickened. His experiments were more extensive than those of Anrep, and were performed on frogs, rabbits, and dogs. The observations on frogs were made by immersing the animals for several days in water containing .08 per mille of atropine sulphate. Every four or five days a frog was removed, and the excitability of its vagus tested. At first no arrest of the heart could be produced on stimulation, but after several days' immersion this was again possible; the sinus and auricles could be arrested, while the ventricular pulse became slowed. He therefore concluded that in frogs the paralyzing action of atropine on the vagus diminishes with prolonged use. The experiments on rabbits (animals little susceptible to atropine) were made by giving daily and increasing injections of the drug. The animals remained perfectly well, and, on testing the irritability of their vagi, this was found to be almost normal after repeated injections, whereas single doses completely paralyzed the nerve. In rabbits, then, after prolonged use, atropine loses much of its paralyzing effect on the controlling mechanism of the heart. In dogs, experimenting in the same way, he found that, even after a considerable time, large doses would completely paralyze the vagus; but that small doses, sufficient under ordinary circumstances to paralyze it completely, would produce only a slight diminution of its irritability, so that stimulation of the nerve then produced not arrest, but only slowing of the heart. In these animals, therefore, the power of adaptation is not so complete as in frogs and rabbits, but is still marked. As regards the action of the heart, Dr. Sabbatino found that the first effect of an injection was to increase the frequency of its pulsations rapidly up to a maximum; this maximum was, however, of short duration, not usually lasting more than ten minutes, after which a diminution commenced, at first rapid, then more gradual, so that even twenty-four hours after injection the pulse-rate did not quite return to normal. Thus the drug produces a great frequency of the pulse, of which part is only temporary, and the remainder of long duration. Four hypotheses may be advanced to explain the above; stated briefly, they are as follows: 1. It may depend on the mode of elimination, which may be at first rapid, and then slower (this would not explain, however, the fact that, with repeated injections, the acceleration produced by each dose is less marked and less prolonged). 2. The drug may not only paralyze the inhibitory but it may excite the accelerator mechanism; and this view receives some support from the fact that the injections are followed by evident excitement of the nervous centres, which may also excite at first the accelerator centre in the medulla. 3. The third hypothesis is that of Anrep, who imagined that a depression of the intracardiac ganglia coming on after that of the inhibitory

apparatus might account for the subsequent gradual slowing. 4. The last and most probable hypothesis is that the great initial frequency is due to the transitory increase of blood-pressure produced by atropine. The inhibitory apparatus being paralyzed, the increased pressure would act as a stimulus to the heart, at first strong, but gradually becoming feebler with the fall of pressure; the accelerator centres may also be at the same time stimulated. From the diminishing effect of repeated doses, the author thinks that with use atropine loses this excitant action on the accelerator mechanism. As regards the action on the nervous centres, he agrees with Albertoni, who concluded (*Arch. f. Exp. Path. u. Pharm.*, 1882) that atropine at first increases the excitability of the brain, but that with repeated doses the excitability is neither so great nor does it diminish the possibility of producing epileptiform convulsions by stimulation of the cortex. The motor apparatus of the iris appears to be usually completely paralyzed, although in one rabbit, after several injections, exposure to a strong light would produce constriction of the pupil. This observation would correspond to the slight susceptibility of these animals to atropine. Some interesting observations were made on the prolonged action of the drug on the secretion of saliva and of sweat. The first few doses would completely mask the effect of pilocarpine subsequently given, but finally a tolerance seemed to be set up, so that pilocarpine would then produce a free flow of saliva and sweat. The tolerance of these mechanisms is, therefore, considerable, but is not prolonged much after discontinuance of the drug, for a further injection after an interval is found to be as powerful as ever. Finally, observations on dogs show that the intestinal nerves also exhibit to some extent a tolerance for atropine. At first the drug produced much intestinal irritation and diarrhœa, but this usually passed off after a few days, unless the dose was increased.—*British Medical Journal*, June 20, 1891.

THE GALLATE OF BISMUTH.

In a preliminary communication Drs. Heintz and Liebreich announce, in the *Gazette Médicale de Paris*, June 20, 1891, that they have found in the gallate of bismuth, which they baptize with the name of "dermatol," a topical application, which they recommend as a substitute for iodoform, in that it possesses all the properties of the latter substance, with the great advantage of being inodorous.

The gallate of bismuth occurs in the form of a fine powder, without odor, of a yellowish-saffron color, and of an aspect somewhat similar to iodoform. It is not hydroscopic, and does not decompose when exposed to the air or the light. It is insoluble in ordinary solvents, and consequently is free from toxicity, for when applied to a raw surface, such as that of a wound, it is absolutely incapable of absorption. It is said not to act as an irritant on the surfaces with which it comes in contact. It possesses considerable desiccating power, and to this extent acts as a stimulant. The authors state that their clinical experiments with dermatol, which have already amounted to more than one hundred, show that cicatrization is rapid and the formation of granulations favored, while the secretion of pus is diminished. They have used this salt in the treatment of burns, in eczema, in ulcerations, in ocular affections with painful morbid secretions, in affections of the nose and ears, and especially in otorrhœa; finally, they add that the gallate of bismuth may be administered internally in the dose of 30 grains, without producing the slightest symptom of poisoning, and it may thus be substituted for the subnitrate of bismuth in affections where this preparation is indicated.

INFANTILE PLEURISIES AND THEIR TREATMENT.

Dr. A. F. Plicque (*Progrès Médical*, January 31, 1891) summarizes his observations on the subject of infantile pleurisies and their treatment in the wards of Dr. J. Simon in the Hôpital des Enfants Malades, Paris. Pleurisy in infants is almost always secondary to some inflammatory or zymotic disease. Effusions have a marked tendency to become purulent, and in the case of children under four years pus is the rule rather than the exception. The collections of fluid are very prone to become encysted, and hence may be met with at any part of the chest, and not always at the most dependent portion. They are liable to burst internally, and the general prognosis is good, provided that the pus has free exit, either through the chest wall or through the lung. Such forms of effusion are, therefore, very different from the similar conditions in the adult. Owing to the almost constant complication with some other morbid condition in the chest, the diagnosis is frequently

difficult. Progressive dulness, with absence of respiratory sounds over the same area, are the only trustworthy signs. The gradual progress of the altered physical signs must be closely watched for a time before a certain diagnosis can be made. In the early treatment of infantile pleurisy the use of calomel and digitalis is recommended, and a protest recorded against the abolition of the poultice, which is believed to aid absorption and to prevent the progress of the disease to the purulent stage. Tapping should always be done at first with the aspirator, an antiseptic solution being used to wash out the cavity. Fluid should always be withdrawn slowly and gently, and the introduction of the antiseptic solution—lukewarm boracic solution is the best for the purpose—performed with equal care and deliberation. No fear need be felt in using large quantities of fluid to flush out the pleura ; as much as five or six litres have been employed. If tapping fails to prevent the re-formation of purulent fluid, an incision must be made and irrigation carried out in the same way. The best point for incision in case of a general effusion is somewhat farther forward than in the case of an adult, the anterior axillary line being selected instead of the posterior line. In case of encysted fluid the incision must be directly over the point of localization. Frequent and cautious washing out of the cavity is advised in after-treatment. Estländer's operation is rarely necessary in the case of infants.—*Chicago Medical Recorder*, May, 1891.

CELASTRINE, THE ACTIVE PRINCIPLE OF CELASTRUS EDULIS.

It is stated in the *Revue Internationale de Bibliographie* for May 25, 1891, that PROFESSOR MOSSO has succeeded in extracting an alkaloid from the celastrus edulis, which he terms "celastrine." Its general action on cold-blooded animals is excitation of the nervous system in the preliminary stage of poisoning with a small dose, with depression in the latter stage with a large dose. On warm-blooded animals, Professor Mosso states that he has constantly found but slight variations in the blood-pressure or the respiration ; it produces stimulation of the cerebrum, and slight excitation of the spinal cord and vagus, and elevation of body temperature. It is a marked cerebral stimulant, and the author believes that its action is closely comparable with that of cocaine. Celastrine is the better stimulant of the two, as it produces no secondary depression and no functional disturbance.

THE DIURETIC PROPERTIES OF THEOBROMINE AND DIURETIN.

We have in previous issues of the GAZETTE detailed the results obtained by a number of investigators as to the diuretic action of theobromine. A number of additional data have recently been published, and have been analyzed in the *Medical Chronicle* for June, 1891, by DR. D. J. LEECH.

Schroeder first showed that caffeine produces its diuretic effect by stimulating the epithelial cells of the kidney, but that this influence is decreased owing to the contraction of the renal vessels which caffeine causes by its stimulating action on the vaso-motor centre. He showed, too, that theobromine, which only differs chemically from caffeine by containing one equivalent less of methyl, and which has less effect on the cerebral nervous system than caffeine, acts as a powerful diuretic in rabbits. He suggested, therefore, that it might be employed as a diuretic in man. Its high price prevented for some time this suggestion being acted upon, but in recent times it has fallen to one-tenth the price it formerly commanded, and Dr. Gram has made a series of observations on its use as a diuretic. He got some good results, but its action was unreliable, because absorption does not always take place ; at times, too, it caused slight sickness. After trying several combinations of theobromine, he met with a compound of theobromine and sodium salicylate, which is very soluble in water, and is now sold under the name of diuretin. This salt is white, and soluble with heat in less than half its weight in water ; and no precipitation takes place on cooling. It contains fifty per cent. of theobromine, and does not cause sickness.

Gram gives records of eight cases in which theobromine sodium salicylate was given. Five were cases of cardiac disease and three of renal disease. In a case of mitral insufficiency, with dropsy and albuminuria, 30 to 60 grains of theobromine caused very marked diuresis without increasing the amount of urea. Caffeine, given with paraldehyde, had subsequently similar but less marked effect in increasing the quantity of urine ; digitalis was without influence.

In another cardiac case in which digitalis

failed, theobromine had, on two occasions, a very marked diuretic influence. Here, however, pericarditis supervened during diuresis following on the administration of theobromine. The quantity of urea passed was not altered.

In a third instance, in which strophanthus was of little service, theobromine sodium salicylate markedly increased the amount of urine passed, and this increase was accompanied by a considerable augmentation in the amount of the urea excreted.

In a fourth case, in which cardiac degeneration with mitral stenosis and insufficiency and albuminuria were present, the diuretic effect of diuretin was on three occasions very considerable, and a calcium salt of theobromine likewise increased the amount of urine. Here digitalis also produced some influence, but strophanthus, caffeine, and calomel proved useless.

In this case it is noteworthy that under the theobromine salt the urea decreased and the albumen was increased in amount.

In the fifth case the theobromine sodium salicylate salt, in doses of 180 grains daily, had a powerful influence in increasing both the water and urea; digitalis proved quite useless.

In three out of the five cases the influence of the theobromine salt was noticed on the same day, and on the day following the administration of the drug.

Of the three cases of nephritis reported, one was treated with theobromine, in doses of 45 to 60 grains daily; the diuresis only showed itself on the fourth day. The total amount of urea decreased when diuresis set in, while the amount of albumen increased somewhat.

In a second case the theobromine sodium salicylate had on three occasions a powerful diuretic influence; in the third,—a case of tuberculosis with nephritis,—the theobromine sodium salicylate not only increased the quantity of water, but the amount of urea also.

There can be no doubt that in Dr. Gram's hands the theobromine sodium salicylate proved a powerful diuretic. He does not, however, record cases (if any), in which he tried it without success.

He found no influence on the heart or circulation produced by the drug, and in the doses in which he gave it—45 to 90 grains—it caused no unpleasant after-effects, and did not affect the central nervous system.

Dr. Hoffmann says that, according to Vulpius, the preparations supplied under the name diuretin do not agree either in the amount of theobromine or in their solubility. He used the diuretin sold by Knoll & Co., which is a combination, he says, of theobromine sodium with salicylate of soda. It has a bitterish taste, and is best given in a five per cent. solution, with a little syrup and peppermint or fennel-water. From such a solution a little theobromine in a few days is precipitated. As diuretin is decomposed in the air, it is not well to order it in powder.

Diuretin is manifestly absorbed after it is taken, for the color-test shows its presence in the urine. In the fæces no trace of it can be found.

Hoffmann administered the diuretin in seventeen cases, whereof five suffered from pleurisy with effusion, one from peritonitis and pleurisy, two from leukæmia and dilatation of the heart, one from cirrhosis, one from acute nephritis, one from amyloid kidney, two from chronic nephritis, and four from organic heart-disease.

In all the cases of simple pleurisy the diuretin caused, on the day following administration, an increase in the secretion of water, in some cases small, but in some cases very large, the amount of urine being doubled or trebled. When the inflammatory condition was subsiding, the increased urine flow seemed to have a favorable effect in decreasing the exudation. Slight diarrhœa occasionally occurred. No other after-effects were noticed, although 75 to 105 grains were given daily.

In the patient where tubercular peritonitis and pleurisy coexisted, no diuretic effect followed the use of the drug, and it likewise failed in the case of liver cirrhosis. On the other hand, in the two cases of chronic nephritis, and in a case of acute nephritis, the diuretic effects seemed marked, but no effect was produced in a case of amyloid kidney complicating phthisis. The most marked instances of the diuretic action of the theobromine compound was seen in cardiac dropsy. In these cases, diuretin was, for the most part, only given when digitalis had failed, and Hoffmann records four carefully-observed cases of its marked diuretic influence in cases of cardiac disease. In twenty-four hours a slight increase of the urine was often noticed, which gradually reached its maximum in two to six days, the quantity falling when the dropsy decreased or the medicine was stopped. In some of the cases recorded the drug produced a marked increase several times, which quickly ceased when it was stopped. Sometimes several days elapsed

before any effect was evident, probably from a slower absorption of the drug. A cumulative action was not observed, and the diuretic action never lasted more than a day or two after the cessation of the drug. The urea excretion increased somewhat under its action. The pulse was usually slightly slowed, often unaltered; in the majority of cases, it became somewhat stronger and less irregular. The appetite improved, though slight but painless diarrhœa came on not unfrequently. An improvement in general health usually followed the strengthening of the circulation, and patients slept better. Excitement was never produced by it.

Hoffmann comes to the following general conclusions with regard to diuretin:

1. It is of marked service in general dropsy. It is of less use in accumulations of fluid due to inflammations of serous membranes. Where there is congestion of the portal circulation it is of no use.

2. Its diuretic action depends upon its influence on the kidney epithelium, but also exercises a favorable influence on the circulatory apparatus. In daily quantities of 75 grains it does not produce any unpleasant effects; on the contrary, it improves the general condition.

3. It may prove of service where digitalis and caffeine have failed, and may be given in combination with heart tonics.

Koritschoner records the effects of the use of diuretin in the words of Professor von Schrotter. Here it was given in thirty-eight cases of severe dropsy,—renal, cardiac, and portal,—and in three cases of acute rheumatism, besides being tried on several healthy men. The treatment was commenced with 60 grains daily, and the dose was increased by 15 grains daily. In sixty per cent. 75 grains sufficed to produce a favorable effect; in thirty per cent. 90 grains were required; in ten per cent. the dose had to be raised to 150 grains. No unpleasant effects were observed after taking it. In twenty-three cases the influence of diuretin surpassed that of other diuretics, and in eight of these it was extremely great. In ten it had a moderate effect, but even here it was as good or better than other diuretics. In four cases the diuresis was only slight, but in all these the patients died within four days of admission to hospital. Only in one case was the drug without any effect. It was found most useful in cardiac dropsy, and less useful in the dropsy dependent on nephritis than in that dependent on the portal circulation. Nevertheless, it was more useful than other diuretics in Bright's disease. It could not be shown to have any influence on the action of the heart.

Konindjy-Pomerantz has observed the effects of diuretin given under the directions of Dujardin-Beaumetz, in the Cochin Hospital. It is described as a compound of theobromine and sodium and of salicylate of sodium.

To prepare it, a molecule of theobromine (180) is dissolved with a molecule of soda hydrate (40), and to the solution a molecule of hydrate of soda (160) is added. When evaporated to dryness, 362 parts of the double compound are obtained, in which there ought to be 49.7 per cent. of theobromine, but some specimens of diuretin do not contain above thirty to thirty-eight per cent. of theobromine. The conclusions arrived at are much the same as those previously described. It is pointed out, however, that diuretin cannot be given hypodermically.

Dr. Konindjy-Pomerantz looks upon it as a stronger diuretic than caffeine, when 45 to 75 grains are given daily in 15-grain doses every two or three hours. Although diuretin acts on the renal epithelium, and it does not influence the contractions of the heart, it should be used with caution in patients suffering from organic disease of the heart.

The increased urine flow produced by diuretin is said to last three or four times as long as that produced by caffeine, and the patient does not get habituated to its use.

It should be given in milk or chocolate before eating. When the kidneys are affected, diuretin has no influence.

THE ACTION OF NICOTINE ON THE CIRCULATION.

Drs. Wertheimer and Colas have recently completed an elaborate experimental investigation as to the action of nicotine on the heart and circulation (*Revue Internationale de Bibliographie*, May 25, 1891). They find—

First.—As regards the heart, destruction of accelerator nerves, or of the extrinsic accelerator centres, does not prevent the production of increased frequency in the cardiac action, as a result of the two phases of poisoning with nicotine. As a consequence, the action of the poison is exercised exclusively on the intrinsic ganglia.

Second.—The increased excitability of the cardiac muscle in poisoning by nicotine is, in the author's opinion, evidenced by the fact that excitation of the apex leads to the production of a series of pulsations and not a single beat only.

Third.—As regards the action of nicotine on the vascular system, when a simultaneous registry is made of the general blood-pressure and of the volume of one of the abdominal organs, the spleen, or the kidneys, it is found that the former diminishes at the moment where the latter increases. This state of affairs is followed by a second phase, during which the fall of pressure coincides with an increase in the volume of the organ. These two successive modifications of pressure are independent; the first being dependent on the constriction of the small splanchnic vessels, the second on their relaxation. While the blood-pressure is increasing, the mucous membrane of the lips and of the tongue becomes the seat of an intense congestion from the excitation of the vaso-dilators of that region. After the complete destruction of the spinal cord, the injection of nicotine still determines an increase of blood-pressure, which may amount to as much as twelve centimetres. Further, if the nerves of one side of the tongue or the lips are divided, the congestion of these parts produced by nicotine is quite as marked as in the normal side. The authors believe that this experiment tends to demonstrate the existence of purely peripheral vaso-dilator and vaso-constrictive ganglia.

Reviews.

A Practical Treatise on Diseases of the Skin. By Henry G. Piffard, A.M., M.D., Clinical Professor of Dermatology, University of the City of New York, etc. 4to. With fifty full-page original plates and thirty-three illustrations in the text.
New York: D. Appleton & Co., 1891.

This work, evidently an outburst of the photographic enthusiasm which has been seething in the mind of our esteemed dermatological *confrère* for several years past, is, in so far as uncolored photographic processes are adequate to portray the various diseases of the skin, a meritorious one, exhibiting the same energy and painstaking care which characterize all of the author's writings. An examination of the plates and other illustrations show that in those diseases in which there is any peculiarity in the arrangement or configuration, or if the lesions are of a gross nature, the portrayal is of value and of interest. This is shown, for instance, in such plates as No. IV., Eczema of the Sole; No. VI., Psoriasis; No. XIV., Syphilitic Dactylitis; No. XXII., Fibroma; Nos. XXIV. and XXV., Elephantiasis; Nos. XXX. and XXXI., Vitiligo; No. XXXIX., Dermatitis Herpetiformis; No. XLIV., Zoster; No. XLVIII., Ichthyosis; and No. XLIX., Alopecia Areata, which carry with them a clear conception of these diseases. On the other hand, those diseases which are to be recognized by their color, or in which the lesions are for the most part small and without any special arrangement, cannot be so satisfactorily portrayed. This is made evident in such plates as Nos. IX. and X., Papular Syphilide; No. XXVII., Acne Indurata; No. XXXII., Scabies; and Nos. XXXVII. and XXXVIII., Chromophytosis. The three plates—Nos. XXVIII., XXIX., and XLI.—showing photo-micrographs of sections of Lupus, Sebaceous Gland, and Eczema Seborrhœicum, respectively, are admirable. The two plates—Nos. XXVI. and L.—depicting Seborrhœa Kerativa (Keratosis Follicularis) and Psorospermosis, two exceedingly rare, but possibly allied, diseases, are of much interest to the specialist. Of the illustrations in the text demanding special commendation are Figs. 1, 5, and 6, Tertiary and Hereditary Syphilis; Fig. 15, Keloid; Fig. 16, Vitiligo; Fig. 23, Trichophytosis; Fig. 26, Zoster; Figs. 28, 29, and 30, Alopecia Areata. The accompanying text is clear, concise, and descriptive, and contains, upon the whole, the essence of the therapy of the subject. The publishers' part of this work leaves nothing to be desired.

Origin, Purpose, and Destiny of Man; or, Philosophy of the Three Ethers. By William Thornton, M.D.
Boston: Published by the author, 1891.

Direct thinking leads to direct writing. Had Dr. Thornton felt impressed with the ownership of a great idea, the reader of the "Origin, Purpose, and Destiny of Man" would have found the great idea in his pages, whereas a most careful reading only leads us up to the conclusion that its unfolding must await a future volume. But years ago the same writer, in "Rationalism in Medicine," claimed to possess a great discovery, and to write his book only for its revelation, and at the end the reader was referred to a future work. Is there a great idea, one naturally asks, or is Dr. Thornton, being in possession

of some specific which, in his hands, has done wonders, only writing to conceal his thoughts, only writing because great and noble souls, who have discovered in the field of medicine in past ages, have been compelled by a generous emotion to give their knowledge to all, and he who would pass as a scientific member of a great and useful body of men must make some show of publicity, and must flaunt something in the air, albeit be not his flag, but only his bandanna?

Dr. Thornton believes in the "three ethers" of man. Not the seven stages, with which Shakespeare has made us familiar, but three ethers. Of which, strange to say, "sulphuric" is not one. If the reader wants to be thoroughly confused and convinced that either he is a fool or the author is, we recommend this book. Listen to this: "According to my philosophy the Creator is not to be found in the universe in any morphological form. He has only a subjective existence,—that is, he dwells in the mind in a subjective sense, and although omnipresent is never objectively manifested." This should be clear, and from it we gather that the Creator—Dr. Thornton's Creator—can be avoided, though the Psalmist thought not, by going into anything with a "morphological form," since the "Creator is not to be found" there. "Morphological" is probably used by the author in a new and original sense, and he probably derives it from the two well-known words "morphia" and "logic."

But to the grand discovery. Nature having formed man out of a few elements, nothing is of use to him when sick but those same elements. Oxygen, hydrogen, nitrogen, carbon, sulphur, phosphorus, and a few more make up the well-known list. Dr. Thornton did not discover this, but he did discover that we are all hopelessly wrong, therefore, in administering any or all of the long but incomplete list of drugs which he furnishes and holds up to opprobrium, beginning with dulcamara, bismuth, kamala, coriandrum, opium, aloes, and so on through two pages of double columns, "none of which are ever found in the body in a healthy state." This is Dr. Thornton's discovery, and it is a double one,—first, that these substances, mostly vegetable, do not contain any oxygen, carbon, hydrogen, etc.; and, second, that these drugs are elementary bodies, and must be excluded, as gold and silver and other inhuman elements are. But the author would by no means fill his suffering patients with crude, even if proper, elements. He sees that pumping the body full of oxygen, hydrogen, carbon, sulphur, and phosphorus would fail to cure even the most simple diseases. He would have us give them in a proper natural combination as a chemical food,—not Parrish's, but his own, and of its form and method of concoction he fails by an oversight to tell us.

The knowledge of the day is but imperfect. We are willing to agree in a measure with him when he writes, "It cannot be said that an absolute analysis of urine has ever been made in a single instance;" but he gives us no way by which we may make the "absolute" analysis, and owns that "a relative analysis answers many practical purposes." He rails, he tells us, against wrong methods to stimulate medical men to investigate the right method. But what is the right method, or what, we ask the careful reader, is Dr. Thornton's method, for he tells it not? "It does not seem impossible," he says, "to infuse the elements of youth into the old man." He does not claim to be able to do this, but his words are suggestive of elixirs of life and fountains of eternal youth. "If phosphorus could be introduced into the nerve-centres unoxidized, a train of diseases would be under perfect control." This may be so, or may not, but it strikes us as the reasoning of the merest pseudo-scientist. If the phosphorus could be introduced unoxidized, and if the nerve-cell, which may be in need of it, or may not, were able then at once to assimilate it, and if it, and it alone, were proved to be all that the nerve-cell needed to restore it to perfect health and activity, then, and only then, would Dr. Thornton's remark be true, even if not original. Again: "Aid nature by using that which she first selected. By this process I was led to the means of removing some of the most extreme cases of congestion. Now, it is well known that suppuration is one of the consequences of congestion and high temperature, manifested by chills and fever." Again: "I have discovered that diabetes mellitus is produced by the absence of that ferment required for the splitting up of sugar into its chemical derivatives." This modest claim to the discovery of one or more of the theories concerning diabetes can scarcely be expected to appeal very strongly to the profession, at least until Dr. Thornton gives us the date of his discovery and some particulars concerning the nature of the "ferment" in question.

We have said that the author fails to tell us his system. We should have said that he fails to make it of practical value to us; he

does give us the system, for we read, page 71: "A complete system of medicine can be founded only on the following principles. . . . Nothing is to be introduced into the body in a diseased state, but that which is formulated from the elements found in it in a healthy state." After this the subject is dropped, and we have a chapter on the "Germ Theory," as he views it. It is quite needless to say that he views it quite wrongly if the scientific world is right, and as his remarks involve contradictions and absurdities, we prefer to side with the scientific world, so that when we reach the chapter on "Immortality," we are scarcely in a frame of mind to value very highly his crude and ponderous statements of the misunderstood and distorted speculations of others. He professes to find God in the universe, and explains Moses, when he writes, "In his own image, male and female, created he them," in a way which would require Moses to understand. Explanations of Moses, like refutations of Moses, are deadly things at present to handle. "He could not mean that God was the image of both male and female at the same time." This the author cannot believe. But he does believe that "births without limbs, fused kidneys, two heads at a birth, four legs and arms, and innumerable morphological peculiarities can all be accounted for by the heterogeneous play of the potentialities;" and with this play we leave him, trusting that the same explanation will account for the peculiarities of the mental birth of the "Origin, Purpose, and Destiny of Man." E. W. W.

MEDICAL SYMBOLISM, IN CONNECTION WITH HISTORICAL STUDIES IN THE ARTS OF HEALING AND HYGIENE. By Thomas S. Sozinskey, M.D., Ph.D., etc. Illustrated.

Philadelphia and London: F. A. Davis, 1891.

Why the serpent and the goat should be animals symbolical in some way of the medical profession is a mystery. The serpent may have prophetically prefigured the bacillus, while the goat might have represented a miasm; or, again, the goat may have been example to the public that it should swallow what we give it without gainsaying. But, then, how much more applicable to the patent nostrum vendor than to the noble and elevated profession we represent! We wonder how many practitioners, trained in the days of the "two years' course," know who Æsculapius was. For such, if such there be, who never heard of him, to whom Anubis and Hermes, "Thoth," and "Chonsu-Nefar-Hotep" are names that conjure up no vast vision of past ages, to whom the pine-cone recalls only sanitas and fir-wood, and the tree of life was but a growth in the biblical garden of Eden, this book was written. In it they will find the germs of many things, the full growth and flower of which they must seek in larger volumes and far deeper study, but if it leads them to this it will have done its work, and its lamented author will have by no means lived and studied and written in vain. E. W. W.

THE PRESCRIPTION, THERAPEUTICALLY, PHARMACEUTICALLY, GRAMMATICALLY, AND HISTORICALLY CONSIDERED. By Otto A. Wall, M.D., Ph.D., etc. Second and revised edition.

St. Louis, Mo.; Aug. Gast Bank-Note and Lithograph Company, 1890.

Did all who essay to write prescriptions master thoroughly the contents of this book before beginning their work, what a marvellous change would be wrought in the druggist's prescription file. How to it would flock as to a sacred shrine all lovers of the beautiful in art, in literature, and in science! The children would study there the art of chirography; the literary man would hasten there to learn a correct and elegant style. The poor boy, if such there be, debarred from school and instruction, would there become finished in Latin and English at the same time. Prescriptions would be sought, not so much for what they could do as for what they could teach, and both pharmacist and doctor would alike rise in the estimation of the educated world.

And while much of the curious lore collected by the author will perchance fail to make our pills purge more painlessly or be more active, yet, since no knowledge ever comes amiss, the professional reader will be interested on every page. He will carry away with him when he closes the book the mysterious history of the sign of the scruple (℈), and will henceforth, in his mind, associate it with the vague speculations of Ignatius Donnelly, the ancient axe-head found in Rome, with the unknown language inscribed upon it, the Aztec hieroglyphics, and all the glamour that the unknown and the ancient cast upon all they touch. We are sorry to find the author describing the "scruple" sign as obsolete, or nearly so, and as "rarely used in prescriptions at present." We think this is a mistake, though probably the metric system has made more progress in the pushing West than in the slow-going East.

How many prescribers are aware that a prescription should consist of the four parts,—base, auxiliary, corrective, vehicle,—or that some would add a fifth,—the "adjuvant." To how many physicians does the word "vehicle" conjure up any idea other than that of a conveyance, by means of which they can reach their patients, *tuto cito et jucunde* for themselves. The most useful part of the book probably is that on the combination of remedies and how "to obtain a new remedy not afforded by any single substance." In regard to the ascertaining of the proper dose of a remedy, the author gives Young's, Cowling's, and Clark's rules, the last being based upon weight, and, if a safe and carefully-studied rule, most applicable to infants. But the reader will find that every point connected with the business of prescribing has been carefully covered by the author, and the youthful graduate, after mastering the book, can face a frowning world undismayed and win golden opinions early in his career from the apothecary and his clerk.

E. W. W.

A Treatise on Massage, Theoretical and Practical: its History, Mode of Application, and Effects, Indications, and Contraindications, with Results in over Fifteen Hundred Cases. By Douglas Graham, M.D., Fellow of Massachusetts Medical Society, etc. Second edition, revised and enlarged.

New York: J. H. Vail & Co., 1890.

This is a very thorough work on massage. It gives us as usual all the history of the process from Homer to Weir Mitchell, all that Plato said about it, and Pliny and Hippocrates. How the Romans and Greeks and Scythians practised it. The author, rather curiously says, "It is astonishing how many there are who have thought that massage was indigenous to their own or some other country."

The author has given us a very thorough and scientific description of the method of applying massage. This, after all, is the test of value in works of the kind. Are they practical? No amount of extracts from Homer or from Cicero would enable the reader to practise the art successfully? Will a perusal of this book suffice? To a certain extent it will. The object-lesson is still invaluable, and the art can be best acquired from a proficient instructor; but, so far as words can tell us, the reader of Dr. Graham's book will, with some experimental practice, become efficient.

The effects—physiological—of this procedure are next carefully studied, and there follows the application of the process to special and particular cases. Here the author introduces his experience of over fifteen hundred cases, with good effect. His chapter on "Massage in Neurasthenia and Anæmia of Women," while it follows closely the teaching of Playfair and Mitchell, possesses much originality, and contains new and valuable ideas. The chapters on "Massage and its Effects on the Internal Organs" are exceedingly valuable, because to a large extent clinical. "Massage in Affections of the Central Nervous System" is a study of its effects in that large class of cases in which diagnosis is most at fault and therapeutics have already failed. Necessarily, the author has to devote considerable space to the misapplication of massage, and its dangers when injudiciously used or overused. "Massage in Writer's Cramp," "Neuralgia and Paralysis," "Muscular Rheumatism," "Scoliosis," "Sprains and Synovitis," "Joint-Affections," and "Rheumatic Gout" are the titles of succeeding chapters, and their pages are full of suggestion, advice in unusual emergencies of practice, and cases in detail.

It is a book which will well repay its diligent reader, and as such can be heartily recommended to those seeking light in practical massage.

E. W. W.

The Pocket Materia Medica and Therapeutics. A Résumé of the Action and Doses of all Officinal and Non-Officinal Drugs now in Common Use. By C. Henri Leonard, A.M., M.D., etc. Illustrated.

Detroit, Mich.: Medical Journal Company, 1891.

This book fills a waiting niche, and will be welcomed by all who have tried to keep up with the recent flood of new remedies and the resuscitation of old ones, which marks the present medical era. Arranged alphabetically, we find under each drug a compact yet complete synopsis of all the facts concerning it which are generally needed, with its preparations and dose. The value of this book over many others lies in its completeness and its fulness. Many works fail in not including all known remedies. Of course, we will not venture to assert that the author has omitted none, but from the multiplicity of rare names and from a somewhat rough but efficient test, we think he errs less than his predecessors. The country practitioner and the pharmacist will both agree in valuing the book.

E. W. W.

Correspondence.

BERLIN.

(From our Special Correspondent.)

Serious Charge against Professors von Bergmann and Hahn—The Carcinoma Cure Craze—An Explanation of the Physiological Action of Tuberculin—Professor Lannelongue's New Treatment of Tuberculosis—Dr. Max Rubner, the Successor of Professor Robert Koch—Discovery of a New Remedy against the Bite of Snakes and Rabies—Blood Inoculations against the Bite of Rabid Wolves—The "Rare Case" in the Panopticum.

Professors Bergmann and Hahn (surgical chiefs of the City Hospital, Friedrichshain), the most renowned of German surgeons, have been charged by Dr. Eugen Leidig, a governmental lawyer, with malpractice, or, more accurately, with making unwarrantable and dangerous experiments on carcinomatous patients. Before entering into details of that charge, which is at present attracting great attention, it will be of interest to learn the history of the case.

A Paris clinician of considerable repute recently created a sensation by reporting before the Academy his experiments regarding carcinoma made in the St. Louis Hospital. The humane French experimenter could boast, not of having cured, but of having artificially produced carcinoma on various hospital patients. Carcinomatous matter was introduced in various portions of the body without the sanction of the patients, and in spite of great pain endured by the patients. The experiments were invariably successful, or, in other words, the patients became carcinomatous. One of the doomed patients died shortly. The Paris Academy protested energetically against experiments of this nature. I think that the President of the Academy would have sustained the reputation of that illustrious institution better if he had called the next policeman, demanding the arrest of the scoundrel. It is revolting to even think that such methods of investigation should ever enter a science the ultimate objects of which are purely of a humane character. It is indicated to construct new and energetic legal restraints to such morbid outgrowths of pathological research.

Soon after the announcement of that French affair, rumors were afloat that the same thing occurred in German hospitals too, and a number of celebrated names were mentioned in that connection. Dr. Eugen Leidig, a governmental lawyer, succeeded in gathering sufficient proof of evidence to charge Professors Bergmann and Hahn with undue experiments in the indicated direction. It is gratifying to know that the German surgeons confined their experiments solely to patients who had already been carcinomatous. The charge specifies and proves that by the experiments of the two professors new carcinomatous foci had been created on previously healthy regions of the body. Professor Hahn is known to have transplanted in a carcinomatous woman three excised carcinomatous nodules to remote portions of the body, and to have thus produced three new carcinomatous foci in previously healthy regions. The particles were covered with healthy skin, and soon began to grow, attaining three to five times their original size. The surrounding tissue showed a distinct carcinomatous character.

Professor Bergmann is known to have repeated this experiment with equally positive results. It is impossible to sanction the principle involved in these experiments, and the best we can say is that such procedures should be punishable if made without the connivance of the patients.

From all appearances the carcinoma craze has succeeded the tuberculosis cure craze. In Cracow, Vienna, and Berlin the cranks are hard at work again to discover the unknown and unknowable. Tuberculosis and carcinoma will continue to remain maladies over which human skill is powerless in spite of all experimentation. Still men of high scientific repute, aside of Hahn and Bergmann, are in Berlin, too, at present engaged to find a cure of cancer. I have learnt that a secret society has been formed, the object of which is to promote the therapeutics of carcinoma.

Professor Adamkiewicz, of Cracow, has gone to Vienna, and demonstrated before the Academy his new method of curing cancer. Adamkiewicz is, in spite of his Polish name, a Prussian, and before being called to Cracow was chief physician in the Berlin Charité and privat-docent in the Berlin University. Adamkiewicz's chief aim was the discovery of the specific carcinoma poison, and it appears that he was successful. If the poison isolated by Adamkiewicz is introduced into the organism of animals two distinct stages can be observed,—viz., one of excitation and one of paralysis. The action of the poison is initiated by an exaggeration of respiration and cardiac activity, dilatation of the pupils, salivation, and cramps; later on, stu-

pefaction ensues. If artificially awaked, the animals do not appear to have the full possession of their motility; they show a tendency to lean on objects, stagger, walk in a circle, and show distinct weakness in the extremities. After small doses, the animals survive, in spite of the threatening symptoms; after large doses, paralysis and death are inevitable. We are justified in review of the above symptoms to assume an implication of the medulla oblongata.

Another series of Adamkiewicz's experiments comprised transplantations of carcinomatous matters, taken from the body of patients, to animals. In the transplanted portions strange and important changes could be observed. The carcinomatous cells begin to disappear, while at the same time so-called destruction foci are discernible even with the naked eye. Microscopical inspection shows peculiar infiltrations, which, in their centre, easily break up, while in the periphery a tendency to rapid extension is manifested. These two properties are regarded by the experimenter as belonging typically to carcinomatous tissues, for in transplanted healthy epithelial matter neither infiltration nor rapid extension can be seen. Adamkiewicz is, therefore, led to conclude, in contradistinction to all opinions generally held, that carcinomatous tissues maintain an exclusive morphological position.

On the above experiments the therapeutic method of Adamkiewicz is based. Unfortunately, he refrains from familiarizing us with the details of his cancer cure. His endeavors, he admits, are directed towards fighting the carcinomatous diathesis by a constitutional treatment. "I have succeeded," Adamkiewicz says, "in making disappear carcinomatous metastases, and in inducing in a carcinoma itself reactions showing an evident tendency towards healing." It is important to add that in the treatment no reactive fever sets in. The future alone can tell whether the interesting experiments of the Cracow professor will be followed by practical benefits. Meanwhile, no one can blame us for being sceptical.

The Koch treatment, for the time being, is dormant, although in our best medical circles the hope is not abandoned that, after proper dosation and elimination of the dangerous element, the Koch treatment will in the near future be a success. Your correspondent knows of a Berlin physician who firmly and solemnly asserts that he has been cured of consumption by the tuberculin injections. Speaking of tuberculin, Professor Oscar Hartwig, Professor of Anatomy in the University of Berlin, has this week published a paper on the physiological action of tuberculin, in which, for the first time, a rational explanation of the action of the Koch remedy is given. Medical journals do not as yet contain this interesting essay, and it will interest you, no doubt, to briefly learn of its contents. The explanation given by Koch himself is, to say the least, unsatisfactory. Hartwig, one of the best observers of cellular life of plants, refers, in his essay, to the laws of chemotropism, discovered by Pfeffer and Stahl, according to which certain chemical substances dissolved in water show either an attraction or repulsion in regard to cells, infusoria, and bacteria. This action is so intense that the cells move in a straight direction towards the point from which the action of the chemical issues. It has been observed that the white blood corpuscles and lymph-cells show highly chemotropic properties. In particular the products of ptomaïne tissue-changes exercise a great attraction in regard to those cells. The tuberculin injection renders the leucocytes chemotropic, and causes their emigration from the vessels in the diseased parts, and the subsequent local reaction observed in the Koch treatment. The degree of emigration and local reaction depends upon a properly-gauged dosation. "*In this manner*," Hartwig says, "*curative phenomena can be induced, and the Koch treatment appears to be based on an absolutely correct physiological principle.*" In conclusion, Hartwig asserts that he does not participate in the pessimistic views held now in regard to the Koch treatment.

A Paris cable announces the discovery of another revolutionizing treatment of consumption. Professor Lannelongue reported on two successive nights his phenomenal success attained in the treatment of twenty-two consumptive patients with *chloride of zinc*. This chemical produces, if properly dosed, in tubercular tissues, a most peculiar transformation. The cells coalesce and form an induration, which at the same time checks the further extension of tubercular tissue. The treatment is universally well borne, and produces no reactive fever. The only secondary symptoms observed were minute bloody extravasations, which, however, soon disappeared. Among the patients treated by the new plan were tubercular affections of the knee- and ankle-joints, of the neck and lymphatic glands, also of tuberculosis of the lungs. The trials were commenced more than a year ago, and thus far have been

highly encouraging. The sclerotized and healed tissues resume in time their former plasticity and motility. The dose is $\frac{1}{40}$ to $\frac{1}{10}$ gramme of chloride of zinc in 100 grammes of water.

All I say in behalf of the Lannelongue treatment is that it takes a good deal of courage to recommend a new consumption cure after the phenomenal collapse of the vaunted Koch cure. Yesterday Dr. Max Rubner, of Marburg, was appointed to succeed Professor Robert Koch in the chair of Hygiene and Bacteriology. Rubner is a pupil of Carl Voit, of Munich. It is Rubner's special merit to have made the best and most useful investigations in regard to tissue-changes, animal heat, and nutrition. Rubner is thirty-seven years of age. His best-known work is a text-book on hygiene.

I am privileged to inform the readers of the THERAPEUTIC GAZETTE of a new and reliable remedy of blood-poisoning caused by snake-bites or rabid dogs. This is the first publication of the matter in any medical journal. Dr. Engels, a German physician, who emigrated in 1874 to Africa and has now returned, is the discoverer of the new remedy. He succeeded, after searching in vain for a reliable remedy for blood-poisoning caused by snake-bites and rabid dogs for seventeen years, in ultimately recognizing the *wild-growing black noble palm* as the hunted treasure. Five hundred negroes bitten by poisonous snakes were treated with the extract of the noble palm, and four hundred and eighty-seven were cured in five days. Of sixty-seven farmers and negroes bitten by rabid dogs, sixty-five were saved, while two died of weakness. The remedy is injected under the skin, and causes a moderate fever, not exceeding 35.5° C. On the third day the patient is without fever, swelling and inflammation of the affected part have disappeared, and on the fifth, or, latest, on the seventh, day the patient is cured. The remedy must be kept in a dark-colored bottle in a cool and dark room. Koch and Pasteur have each received a bottle of the precious extract, and, as soon as these authorities have expressed their views, the details in preparing the remedy will be published. The German chemist, Dr. Baismeyer, has also part in the merit of discovering this new remedy.

Almost simultaneously, a Bucharest physician, visiting Berlin, publishes in the *Berliner Vossische Zeitung* a new vaccination method exhibited by Professor Babesch, of Bucharest, against the bite of rabid wolves. Babesch, one of the ablest pupils of Koch and Pasteur, director of the Bucharest Pasteur Institute, is frequently called upon to treat patients bitten by rabid wolves. The Pasteur method of using particles of spinal cord taken from rabbits which died of rabies is ineligible in the case of bites from rabid wolves, as in these cases the lyssa breaks out almost immediately after the bite. Professor Babesch has cured twenty-four patients out of twenty-seven by injections of blood taken from animals rendered immune by the Pasteur method. Twenty grammes of such blood are injected into the cellular tissue of the abdomen.

I cannot conclude my letter without the typical "rare case." There are two sayings *en vogue* in Berlin medical circles,—viz., that in the Charité every day a case can be seen which has never been seen before, and that Professor Bergmann performs every day an operation which has never been performed before. This time my rare case, however, is neither in the Charité nor in Bergmann's clinicum, but in the Panopticum. It is one of the greatest freaks of nature ever seen by Berlin physicians. The man is of small size, lean, and healthy appearance. He claims to have an extraordinary power over his muscles and heart. He can, at least, cause the most various and apparently impossible alterations in the appearance of his body. At will he is, for instance, able to make the muscular parts of his extremities as hard as a stone. More than that, he rolls his intestines together into a lump like a cannon-ball, makes them project out of the abdominal cavity, or draws them up into the chest, so as to give the abdomen the appearance of a skeleton covered by skin. The freak also is able to represent a man in the various stages of strangulation, showing thus his abnormal power over the muscles of the neck. The height of his ghastly power the man shows by what he calls stopping his heart. At first sight it would indeed appear as if both the cardiac organ and the circulation had stopped. No pulsation can be felt at the radial, temporal, or other artery. Deep pallor, followed by great cyanosis, seems to indicate the interruption of the arterial flow. As long as four minutes these unheard-of phenomena persist, and the stethoscope alone is able to detect the persistence of cardiac action.

The Panopticum also harbors a man who is a great trouble to Professor Ewald, our authority on affections of the digestive tract. The man, called Vitreo, besides eating glass in considerable quantity, lives almost exclu-

sively on old leather, old boots being his favorite dish. Ewald is compelled to admit that, in view of Vitreo's digestion, all his theories, so ably expounded in the professor's new text-book, are all "bosh."

Concluding this letter, I just learn that the Prussian minister of cult, Herr von Zedlitz-Truetschler, has ordered Professors von Bergmann and Hahn to answer within twenty-four hours to the charge of malpractice on carcinomatous patients advanced by Dr. Leidig, the governmental lawyer.

BERLIN, July 18, 1891.

Notes and Queries.

IODOPHENACETIN—A NEW ANTISEPTIC.

This is a new derivative of phenacetin, which was described by DR. SCHOLVEIN at a recent meeting of the Berlin Pharmaceutical Society (*Oesterr. Zeitschrift für Pharmacie*, June 10, 1891).

When a cold-saturated solution of phenacetin, acidulated with hydrochloric acid, is treated with iodine, a gray precipitate forms, which afterwards appears as a mass of crystalline needles or an amorphous mass. It forms, when dry, a chocolate-brown powder. When recrystallized from glacial acetic acid, it may be obtained in steel-blue crystals.

In preparing this substance on a large scale, it would be necessary to operate with very large quantities of liquid, if a mere aqueous solution of phenacetin were employed. This is avoided by dissolving the phenacetin in glacial acetic acid, and afterwards diluting with water.

The resulting product, called *iodophenin*, melts at 130° C., decomposing at the same time. It contains one portion of its iodine in a more intimate combination than the other. It is soluble in 20 parts of cold glacial acetic acid, more easily in the same liquid when hot, and is also soluble in alcohol. It is difficultly soluble in benzol and chloroform, and insoluble in water. If heated with water, it is decomposed.

It has a strong odor of iodine, and a burning taste; when heated, a part of the iodine is given off. Ordinarily it contains about 50.5 per cent. of iodine.

The author's experiments have shown that this substance possesses marked powers as a bactericide, and it also has been subjected to a certain amount of clinical study, which, however, shows that when given subcutaneously it produces marked local irritation, and when given internally it forms combinations with the alkalies of the intestinal canal, and consequently from the readiness with which iodine is given up iodine-poisoning may readily follow the administration of even small doses.

THE PHYSIOLOGICAL ACTION OF KOLA NUT.

DR. KOTLIAR, wishing to elucidate the action of kola nut, which, as is well known, has been recommended for increasing the power of the body to undergo a severe strain of work, has made a series of observations in Professor Manassein's clinic in St. Petersburg on the alteration of the chemical processes of the body when under the action of the drug. The observations were made on seven healthy young men, each being observed for two consecutive periods of five days. In some the drug was given during the first period, and the subject was kept at rest from work. In others the subjects worked hard, and the drug was given during the second period. The quantity of powdered kola nut taken per diem was a drachm. From careful analyses of the food and excreta, it was found that, under conditions both of rest and work, kola increased the assimilation of phosphorus and sulphur. That of chlorine was increased during rest, but was not altered by kola under conditions of work. The metamorphosis of chlorine was diminished by kola both under conditions of rest and work, especially in the latter case. The metamorphosis of phosphorus was diminished both at rest and at work, but more especially during rest. The same may be said of sulphur. Finally, the breaking up of phosphorus and sulphur compounds both during rest and work, as compared with that of nitrogenous compounds, was diminished. The paper referred to is published in the *Vrach*, No. 19, 1891.—*Lancet*, June 20, 1891.

COCAINE AND MERCURY COMPOUNDS.

A delicate reaction between cocaine hydrochloride and calomel has been observed by M. SCHELL (*Journ. Pharm. Els. Loth.*, January, p. 8). If a trace of cocaine hydrochloride be mixed by means of a dry glass rod with a very minute quantity of calomel, and the mixture be breathed upon, the moisture that condenses is sufficient to cause it to

blacken immediately. No other alkaloid has been found to give the same reaction, but atropine and calomel acquire a similar coloration in boiling water or alcohol and water. It is curious to note, however, that in the case of atropine it occurs with the free alkaloid and not with a salt, while in that of cocaine it occurs with a salt and not with the free alkaloid. HERR BRUNNER also has called attention to the incompatibility of some preparations for outward application, in which a cocaine salt is ordered in conjunction with a mercurial compound (*Apot.-Zeit.*, February 11, p. 86). An ointment of mercuric oxide and cocaine hydrochloride, for instance, is ordered in ophthalmic practice, but after being kept for a time the anodyne effect of the ointment gives place to a pronounced caustic action, due to the conversion of mercuric oxide into oxychloride. An ointment of cocaine hydrochloride, silver nitrate, and vaseline, sometimes ordered as a dressing for wounds, is also liable to undergo alteration through formation of silver chloride, but it is pointed out that this change can be retarded by thoroughly mixing the solution of silver nitrate with the vaseline before adding the cocaine hydrochloride.—*Pharmaceutical Journal and Transactions*, February 28, 1891.

THE DANGER OF UNBOILED MILK.

In the *Lancet* for March 7, 1891, the Paris correspondent writes that for some years he has been in the habit of recommending the boiling of milk as a matter of routine, epidemics of typhoid fever having been sufficiently often traced to a contaminated milk supply to warrant the adoption of this simple and efficacious precautionary measure. About a year ago the Académie de Médecine pronounced itself formally in favor of this practice. Many people, however, have a rooted objection to the taste of boiled milk, and, as a matter of fact, that liquid is generally drunk unboiled. The public will perhaps be more inclined to depart from the beaten track when they read of the following case brought to the notice of the Académie de Médecine by M. OLLIVIER, one of the physicians of the Hôpital des Enfants Malades. Clinicians are "moving heaven and earth" to exorcise the ogre tuberculosis, and, in our anxiety to discover an antidote for the ravages of the terrible bacillus, we are apt to forget the old adage, "Prevention is better than cure." The case related by M. Ollivier was that of a young lady, aged 20, whose family and personal health antecedents were excellent, but who had the misfortune of being brought up in a school where, in the space of a few years, six out of thirteen girls had fallen victims to tuberculosis, two being cases of tabes mesenterica. The young lady succumbed rapidly to tuberculous meningitis. An examination of the udder of the cow which had for nine years supplied the school with milk was, after death, found to be the seat of extensive tuberculous lesions. M. Nocard emphasized the contention of M. Ollivier that unboiled milk should be banned, however healthy the cow yielding it may appear, by relating how the lymphatic glands of a calf in seemingly excellent condition, which, to the great disappointment of its owner, had died after a few days' illness had been found stuffed with bacilli. A short time afterwards the mother of this calf—a fine beast, to which had been allotted numerous prizes—died in her turn, and the udders, lungs, and lymphatic glands were discovered to be tuberculous. The lesson taught by these two interesting communications is plain,—avoid unboiled milk.

THE EFFECT OF ASPARAGUS ON THE URINE.

One of the curious by-ways seldom explored by science is that which PROFESSOR NENCKI, of Berne, has lately investigated (*Arch. f. Exp. Path. u. Pharm.*, Bd. xxviii., Hft. 3 u. 4). It is, namely, the determination of the familiar change in the odor of urine that follows on the eating of asparagus. Hilger attempted to isolate the body causing this odor, by distilling the urine passed after a three days' diet of this vegetable, but he could not arrive at a definite result. Professor Nencki, availing himself of the good offices of four of the workers in his laboratory, who substituted for their mid-day meal a repast of asparagus, collected the urine passed by them up to 8 P.M. on the same day, acidulated it with oxalic acid, and distilled it over a sand-bath. The volatile products were conducted into a solution of cyanide of mercury, causing a precipitate therein; and this, together with a similar deposit obtained by another trial, was collected, washed, and, being treated with a small quantity of a five per cent. solution of hydrochloric acid, was again heated, the vapor, which had the characteristic odor of methyl-mercaptan, forming a bright yellow crystalline deposit in

a solution of plumbic acetate. The odoriferous body in the urine is, therefore, in all probability methyl-mercaptan. Previous experiments by Professor Nencki and M. Sicker have shown that this substance is one of the products of fermentation of albumen, and also of gelatin, and that it forms one of the constituent gases of the large intestine. Indol and phenol are also derived from the putrefaction of albumen, and it is probable that other sulphur-holding bodies are similarly derived. As to its connection with asparagus, Professor Nencki quotes an interesting communication from Dr. O. Loew, of Munich, to the effect that asparagin contains an organic sulphur compound, and that it is highly probable that methyl-mercaptan is formed in the albuminous disintegration which takes place in the germination of the plant.—*Lancet*, April 11, 1891.

THE COMBINATION OF IODINE AND GLYCERIN.

If tincture of iodine is mixed with glycerin the latter will keep the skin moist to facilitate the absorption of the iodine. This is recommended by Dr. Hammond and may lead to a new Galenical preparation. Experiments are now in order to see how such a preparation will keep.—*Pharmaceutical Record*, June 18, 1891.

MEDICATED OILS FOR HYPODERMIC INJECTION.

Several fixed oils, particularly those of olive and almond, have for some time past been used by numerous European practitioners as vehicles for the hypodermic administration of certain remedies, and to some extent this has also been practised in this country.

In a recent issue of *Le Progrès Thérapeutique*, A. VICARIO points out the necessity of carefully sterilizing the respective liquids, and gives various practical hints, which we give here in abstract.

Preparation of the Solutions.—This is either made by simply mixing the ingredients, if liquid, or by producing solution by means of a water-bath, in which latter case the most volatile substance must be added after the others have become liquid.

Sterilization of the Solutions.—The liquid is placed in a sterilizing flask. (Pasteur's retort or Chamberland's pipette-flask is mentioned by the author. Any bottle with long and narrow neck, which may be stoppered with a pellet of cotton, may be used.) The flask is then heated in a sterilizing oven at a temperature of 120°.

Filling into Bottles.—The liquid is now transferred, under proper precautions, into previously sterilized small bottles. If a Chamberland's flask is used, which has a bent neck and is drawn out to a fine tube fused at the end, the latter is broken off after sterilization is completed, the tube pushed through the cotton stoppers of the small bottles, and the liquid thus transferred without risk of reintroducing germs or bacteria.

Formulas.—The most usually employed preparations, which are particularly used in *phthisis*, are the following:

Picot's Solution.

Guajacol, 5 gm. = 75 grains;
Iodoform, 1 gm. = 15 grains;
Olive oil,
Liquid vaseline, aa eq. parts to make 100 c.c. = 3½ fl. oz.

Pignol's Solution.

Eucalyptol, 14 gm. = 216 grains;
Guajacol, 5 gm. = 75 grains;
Iodoform, 1 gm. = 15 grains;
Olive (or almond oil), to make 100 cc. = 3½ fl. oz.

Morel-Lavallée's Solution.

Eucalyptol, 12 gm. = 185 grains;
Guajacol, 5 gm. = 75 grains;
Iodoform, 4 gm. = 60 grains;
Olive oil, to make 100 c.c. = 3½ fl. oz.

The hypodermic dose of these solutions is from 3 c.c. to 12 c.c. (50 to 210 minims) in twenty-four hours. Besides the above, there are also in use plain solutions, in olive or almond oil, of creosote (1 to 15), eucalyptol (2 or 4 to 10), etc.—*American Druggist*, June 15, 1891.

THERAPEUTIC PRECISION.

To illustrate the proposition made with regard to the simplification of therapeutics, the need of precision in our therapeutic endeavors may be cited. Let any practitioner consider his method of prescribing, let him enter upon an introspection of the motive and manner of executing it in any individual case. He will probably be surprised upon how illogical and uncertain a basis his whole *modus medendi* is constructed. The mass of therapeutic work we are called upon to do unfits us for precise work, for the recording of cases and results, and thus deprives us of the only rational basis for correct deductions. It is

extremely difficult to remedy this source of error, but the other source referred to, the shot-gun prescription, may be easily avoided.

By prescribing simple remedies possessing well-known therapeutic qualities, we may be reasonably certain of what we accomplish.

To illustrate from actual practice. The writer had occasion in his hospital service to treat a case of acute articular rheumatism in which salicylate of sodium had been ordered. His usual method is 20 grains every two hours until the physiological effect, tinnitus aurium, is produced. The house physician being still under the influence of his predecessor in the service, a man of unexceptional attainments, who had ordered 10 grains four times a day, asked, for his own instruction, an explanation of this difference in the method of prescribing so simple a remedy. The reply was that the object of the salicylate treatment was to relieve the arthritic pain, reduce the temperature and other manifestations, and that since these results are never completely attained until the patient is fully under the influence of the remedy, it is advisable to accomplish the latter as quickly as possible. Four or five 20 grain doses of salicylate of sodium administered every two hours will relieve these patients with almost mathematical precision, while 10 grains four times a day would act as a mere placebo until by accumulation the system is brought under the influence of the remedy. It would be just as rational to order for a patient suffering from an intense supraorbital neuralgia $\frac{1}{16}$ grain of morphia every two hours when a hypodermic of $\frac{1}{4}$ grain would relieve promptly because the system would be at once brought under the physiological effect (narcotic) of the remedy. Just so irrational is it to grope the way with small doses of quinine in malarial fever. If we have a genuine case of malaria, we have in quinine a specific; this specific action is best attained by cinchonization of the patient before the paroxysm is due. Clinical experience has established this as an axiom. Why scatter our forces over hours and days and obtain at last only the cumulative effect of smaller doses, when one or two full doses will protect the patient against the enemy? The same may be held with regard to many other remedies of less specific curative effect.

Take antipyrin, for instance. Why administer 5 grains every two hours and then trust to the probable accumulation of the remedy until its antithermic effect may be attained, when with one moderately large or full dose we may at once reduce the temperature? The patient's comfort is enhanced by the smaller number of doses, by the more speedy attainment of the result, and his safety is thereby secured with more precision and accuracy. Within the limits of safety, which in the case of most remedies are pretty well defined, it would seem to be the dictate of common sense to endeavor to obtain the most definite results by the largest necessary doses.

Not only from his own experience does the writer draw this conclusion, but the latter is warranted by the study of the teachings of the best clinical teachers.

There are some remedies in which a gradual advance in dosage is necessary, as, for instance, when Fowler's solution is prescribed for certain cases of chorea. Here the uncertainty of the effect, the frequent idiosyncrasies demand, and the chronic character of the disease warrants, the graduated dosage, although here too we are content when the physiological effects, irritation of the gastro-intestinal tract, œdema of the lids, etc., are manifest.

When our teachers will clearly define the therapeutic limitations of our remedial agents, and when we abandon the "t. i. d." habit of prescribing which clings to us like a barnacle from the hoary past, a long stride will be made in the direction of definite therapeutics. —*Dietetic Gazette*, June, 1891.

TYPHOID FEVER WITH ARTERIAL THROMBOSIS AND MANIA.

At the meeting of the Clinical Society of London, held May 22, 1891, Dr. Sidney Phillips related a case of typhoid fever with occlusion of the femoral artery during convalescence, and with acute maniacal attacks (*Lancet*, May 30, 1891). The patient was an adult male, and the attack was a mild one, but the heart's action weak and irregular from the first. During convalescence sudden pyrexial attacks occurred. The first rise was to 103°, with sudden pain in the right hypochondrium; the second to 103.4°, and the left common femoral artery became blocked, with absence of pulsation in it and in the popliteal and tibial arteries. Retention of urine occurred at the same time. The limb became powerless, with slight anæsthesia. There was slight œdema of leg and foot, and the affected limb became hotter than its fellow. The surface thermometer showed on one day a difference of five degrees. The rise of temperature lasted three weeks. Pulsa-

tion gradually recurred in the limb, which completely recovered. In the third attack of pyrexia the temperature rose to 103.2°, subsiding with epistaxis. The fourth, fifth, and sixth attacks of fever were accompanied by outbreaks of excitement, almost of acute mania, and in one the temperature rose to 106.1°. The patient eventually became quite well. Dr. Sidney Phillips said the plugging of the artery might have been from thrombosis or from embolism, probably the latter; such plugging of the large arteries was not very common as a sequela of fevers, and frequently led to gangrene, as in the case lately recorded in the *Lancet* by Dr. Drewitt. A rise of temperature in the affected limb after occlusion of the main artery was not usual, and even if the ordinary collateral circulation were sufficient to the temperature of the part up to the normal, it could not be credited with raising the temperature above the normal. It seemed probable that the shock of the embolism led to a reflex paralysis of the spinal centre, producing retention of urine, and the same shock in the same way led to a paralysis of the vaso-motor constricting nerves of the arteries of the lower limb, allowing an unusual hyperæmia. Dr. Gaskell had shown that these nerves originated in the anterior cornua of the spinal cord, and passed out in the anterior nerve-roots to the sciatic plexus. Anything, therefore, which would produce a paralyzing influence on the spiral centres for the bladder might also paralyze the centres of origin or the vaso-motor nerves to the arteries of the leg. Referring to the maniacal attacks, Dr. Phillips observed it was not common to get such attacks as immediate sequelæ of fever, with such rises of temperature, the patient being quite calm and the temperature normal in the intervals. Possibly they were embolic in origin, but more probably were only signs of functional nerve-disturbance in an emotional individual.

THE ACTION OF ANTISEPTICS UPON THE PERITONEUM.

DELBET, GRANDMAISON, and BRESSET (*Annales de Gynécologie et d'Obstétrique*, 1891) as a result of their united experiments and observations, arrive at the following conclusions:

1. The strong antiseptics, such as carbolic and salicylic acids, corrosive sublimate, and biniodide of mercury, present more disadvantages than advantages, since they irritate a healthy peritoneum, and thus favor the formation of adhesions.

2. The most useful solutions to be employed in laparotomy are one of sodium chloride (6 or 7 parts to 1000), and of boric acid (3 parts to 100).

3. Iodoform and salol exert but little action upon the peritoneum, and it is a question if they have any antiseptic effect.—*American Journal of the Medical Sciences*, July, 1891.

A CHEAP DISINFECTANT.

At this season of the year, and during the summer and autumnal months, disinfectants should be kept ready at hand for needed use, but not in any measure to take the place of cleanliness.

The nitrate of lead is the cheapest disinfectant known that fulfils its intent. It does not, however, prevent putrefaction. The chloride of lead is much more effective in all directions. It is made by dissolving a small teaspoonful of nitrate of lead in a pint of boiling water; then dissolve two full teaspoonfuls of common salt in eight quarts of water. When both are thoroughly dissolved, pour the two mixtures together, and when the sediment has settled you have two gallons of clear fluid, which is the saturated solution of the chloride of lead. A pound of nitrate will make several barrels of the liquid. The nitrate of lead costs from eighteen to twenty-five cents a pound at retail.—*Monthly Bulletin*, June, 1891.

ALKALINE SILICATES IN THERAPEUTICS.

Alkaline silicates have been little employed in therapeutics, being scarcely mentioned in the most recent text-books. It is shown, however, in *La France Médicale*, June 19, 1891, that these salts possess many properties which may be of therapeutic value. Silicate of potassium has been prescribed in various vesical troubles, and DR. BONJEAN mentions that the silicate of sodium dissolves uric acid with the greatest readiness, causing the elimination of a limpid, colorless urine, and in that it thus assists in the elimination of uric acid may prove of value in diseases where uric acid predominates. The administration of these salts, such as the silicate of sodium, in doses of 7½ grains, renders the urine alkaline, without interfering with the elimination of uric acid.

It has been used with more or less success in cases of gout, gravel, and chronic rheumatism. So also as a local application, the solution of the silicate of sodium prevents the de-

composition of pus, and thus is well suited as an application to putrid wounds, etc.

Dr. M. Sée has likewise used injections of silicate of sodium in gonorrhœa, and maintains that its effects are most satisfactory, as is also the case when it is used locally as an application to venereal ulcers.

A CASE OF POISONING FOLLOWING THE EXTERNAL APPLICATION OF TOBACCO.

Dr. Auché, in the *Journal de Médecine de Bordeaux*, March 22, 1891, points out that, notwithstanding the powerful poisons contained in tobacco, its use as an external application is confined chiefly to popular medicine; also that, although certain smokers use large quantities, and some chewers absorb the juice daily, poisoning is nearly wholly due to the external application of the drug.

The different degrees of tolerance met with, he thinks, may depend to some extent upon the mode in which the active principles of the plant gains access to the system.

Having given a short description of some recorded cases of poisoning from the external use of tobacco in various forms, the symptoms noted being nausea, vomiting, hiccough, difficulty of breathing, excessive prostration, coldness of the extremities, cold clammy sweats, with a feeble and intermittent pulse, Dr. Auché describes the following rather anomalous case observed by himself:

A man suffering from pediculi pubis made a decoction by boiling two hundred grammes of tobacco in two litres of water. Some of this he rubbed over his whole body, and, having allowed his skin to dry without wiping himself, put on his clothes. A few hours later he again went through the same process. An hour afterwards, while working, he was suddenly seized with heaviness of the head, nausea, vertigo, and dimness of sight, cold sweating, and excessive pallor of the skin; also with marked trembling, and very great weakness of the arms and legs.

When seen, the face was exceedingly pale, and covered with a cold and clammy sweat; the extremities were cold, pallid, and a little cyanosed. The vertigo was constant, and more marked when sitting up. There was no headache; his thoughts were clouded. He could make out the general shape of objects, but their outlines were blurred; the pupils were a little dilated, but reacted to light and accommodation. Hearing was dulled. There was a continuous feeling of nausea, but the inclination to vomit was easily overcome.

The respiratory movements, beyond being weak, were normal. When interrogated with regard to his breathing, the patient said, "He felt as if he had a constriction around, or a weight upon, his chest."

The heart pulsations were 60; the apex-beat only feebly felt; the pulse small, thread-like, and scarcely perceptible. The genito-urinary system was normal.

The limbs trembled markedly, particularly the legs, when he attempted to stand. Sensation and the reflexes were normal.

After three hours the symptoms gradually disappeared, leaving only a violent headache. —*Medical Chronicle*, June, 1891.

THE CAUSE OF DIPHTHERIA IN RURAL DISTRICTS.

Dr. Longstaff, in a recent voluminous work on "Statistics, Social, Political, and Medical," makes an interesting study of the causes of diphtheria, more particularly, of course, as it occurs in Great Britain. He finds that it is a disease of the country rather than the city. Thus, for every thousand deaths from the disease in dense districts there are eleven hundred and seventy-eight deaths in medium districts, and fifteen hundred and seven in sparse districts. With regard to specific causes, Dr. Longstaff says, "The cause or causes should not be sought for, primarily, in any high development of civilization, such as sewers, but rather in some condition associated with more primitive modes of life. Again, privies and ash-pits can hardly be important agents in breeding or disseminating the disease, or we should expect to find diphtheria exceptionally prevalent in those northern towns where such nuisances reach their worst, whereas the contrary is the case. On the other hand, low vegetable organisms developed in damp dwellings would perhaps fit in with the facts that I have brought forward; or, again, some evil special to shallow wells or other primitive sources of water-supply. The line of investigation, however, which seems to me most promising, lies in comparative pathology. The peasantry live on intimate terms with domestic animals, more particularly cows, sheep, pigs, and poultry (including pigeons). Some little known disease of some one or other of these creatures may be capable of inducing in men or women, brought into frequent or close con-

tact with them, a trivial 'membranous sore-throat;' then, under suitable conditions of recipient and environment, the more generally-recognized form of the disease, 'true diphtheria,' or, as it used to be called, 'cynanche maligna,' may result. The poison, perhaps, gathering intensity and infectiveness, may then be conveyed into towns by farm produce, such as milk, cream, or poultry, conceivably by eggs, meat, or vegetables; and, lastly, through the person first infected, the sources of water-supply or the public sewers may get poisoned, and so, indirectly, aid in the spread of the disease."

The suggestion is one that country practitioners should bear in mind. At the same time it is quite possible that the lessened death-rate from diphtheria in large cities is due to a superior sanitary organization.—*Medical Record*, June 27, 1891.

PERMANGANATE OF POTASSIUM IN DIPHTHERIA.

Dr. Netzetzky says that his twenty-two years' practice convinced him that the best treatment of faucial diphtheria consists in an energetic use of permanganate of potassium. The drug should be administered in the shape of paintings and gargle. The following strong solution should be employed:

℞ Potassii permanganatis, ʒi;
Aquæ destillatæ, ℥i. M.
Sig.—To paint the affected surface every three hours.

For gargling, which is to be repeated as often, a teaspoonful of the same solution should be mixed with a tumblerful of boiled water.

In those cases in which the child is unable to gargle, the following mixture should be given internally:

℞ Solutionis hydrogenis superoxydati, two per cent., ℥ii;
Glycerinæ, ʒii. M.
Sig.—A teaspoonful every two hours.

—*Medical Record*, June 13, 1891.

LOCAL USE OF MENTHOL AND EUCALYPTOL IN AFFECTIONS OF THE MIDDLE EAR.

Dr. Adolph Bronner, in the *Archives of Otology*, gives some interesting facts concerning the use of these remedies in certain diseases of the ear: "The most favorable cases seem to be those of chronic swelling of the mucosa, while in the initial stages of some cases of sclerosis I was inclined to think that I had prevented the encroaches of the disease. When the mucosa is greatly swollen, I direct the use of a snuff of boric acid with two per cent. of menthol, to be frequently used in small quantities, while at the same time I inflate the middle ear with the catheter and menthol vapor. A few drops of a twenty per cent. solution of menthol in olive oil is poured into an antiseptic capsule, and this is then firmly attached to the catheter." The capsule used is similar to the Hartman capsule, and the current is passed through by use of Lucae's modification of the Politzer bag. The vapor is slowly inflated, and much stress is put on the *prolonged use* of this agent upon the diseased mucosa. "I do not remember having produced any pain or inflammation from this procedure, and, on the contrary, I think that by the use of the menthol I have been able to relieve the slight occasional pain."—*Ophthalmic Record*, July, 1891.

Dr. Samuel O. L. Potter, Professor of Medicine in the Cooper Medical College of San Francisco, and a graduate of Jefferson Medical College of Philadelphia (with first prize, 1882), recently passed the required examination, and was admitted on April 30 last a Member of the Royal College of Physicians of London, forming one of a class of nine candidates, all of which were M.D.'s of British universities,—viz., three of Cambridge, one of Oxford, one of Edinburgh, two of London, and one of Aberdeen.

Those who understand the peculiar rank of British qualifications will recognize the M.R.C.P. of London as the "Hall-Mark" of the British medical profession, and that it is a coveted one may be seen from the fact that all the candidates therefor were previous M.D.'s or M.B.'s of universities, asking this as an additional honor. The qualification of this college, given at the ordinary final examination of students, is the license "L.R.C.P., London," and does not admit, as does the membership, to the college itself.

The only other Americans holding this qualification are Professor Osler, of Baltimore, and Dr. Robinson, of San Francisco. It is also held by two English practitioners in California, one in Washington, one in Canada, and one in British Columbia.

VIRUS